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WARS 1983-2002

Wildlife Accident Reporting and Mitigation in British Columbia

Special Annual Report

Ministry of Transportation
Engineering Branch
Environmental Management Section

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Wildlife Accident Reporting and Mitigation in British Columbia
Special Annual Report

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Abstract:

The Wildlife Accident Reporting System (WARS) is designed to collect and store information on wildlife killed on highways in British Columbia. The WARS database contains over 78,000 records collected since 1978. Wildlife accident information is used by the Ministry to:

1) Identify accident-prone locations and accident trends;
2) direct cost-effective mitigation efforts;
3) evaluate the effectiveness of mitigation techniques;
4) provide data for highway planning purposes;
5) model and forecast accidents;
6) analyze traffic and climatic relationships for species-specific accident trends;
7) develop species-specific accident risk profiles for highway corridors; and
8) establish policies and strategies for accident issues and mitigation initiatives.

The success of the WARS system in British Columbia has made it a model for other agencies seeking to monitor wildlife-related motor vehicle accidents.

Comments: In 2002, Ministry Maintenance Contractors reported finding 5,032 dead wild animals on British Columbia highways. Approximately 80% of the animals reported killed were deer. The number of wildlife accidents reported to the Ministry decreased by 2.7% from 2001.

Keywords: WARS, wildlife, accident, reporting, system, road, kills, statistics, exclusion, fencing, British Columbia, risk, cost, deer, moose, elk, bear, sheep, mitigation, overpass, underpass, road ecology.

EXECUTIVE SUMMARY

The British Columbia Ministry of Transportation (BCMoT) administers the Wildlife Accident Reporting System (WARS). The WARS system is designed to analyze wildlife accident data collected by BCMoT Maintenance Contractors on numbered highways in British Columbia.

Since 1978, over 78,000 wildlife accidents have been reported on provincial highways. More than 90% of the accidents involved deer, moose and elk. Between 1995 and 2000, 13 people were reported killed in wildlife-related motor vehicle accidents in British Columbia. After weather, the Insurance Corporation of British Columbia (ICBC) rates wildlife as the next highest environmental contributing factor for police-attended accidents. Between 1997 and 2002, ICBC spent over $118 million on wildlife-related motor vehicle accident claims.

In 2002, over 5,000 wildlife-related accidents were reported in British Columbia (table below). Between 2001 and 2002, the number of wildlife-related accidents reported decreased by 2.7%.

Wildlife Accidents by BCMoT Region (Year 2002)

	Region 1	Region 2	Region 3	Total
Wildlife Accidents	1,221	2,871	939	5,031

In 2002, it is estimated wildlife accidents cost the Province over $20 million in motor vehicle accident claims; $580,000 in highway accident clean-up costs; $320,000 in lost provincial hunting license revenues; and $30 million in lost value to residents and non-residents who view or hunt wildlife.

BCMoT is committed to protect the safety of the motoring public; stem the rising societal cost of human fatalities and injuries, motor vehicle damage, and highway maintenance; and reduce the loss of wildlife on provincial highways. Consequently, BCMoT uses the WARS system to:

1) identify accident-prone locations and accident trends;
2) direct cost-effective mitigation efforts;
3) evaluate the effectiveness of mitigation techniques;
4) provide data for highway planning purposes;
5) model and forecast accidents;
6) analyze traffic and climatic relationships for species-specific accident trends;
7) develop species-specific accident risk profiles for highway corridors; and
8) establish policies and strategies for accident issues and mitigation initiatives.

The WARS system is becoming an increasingly valuable information resource for BCMoT, and other government agencies, consultants, researchers, wildlife associations, special interest groups and members of the general public. The Ministry of Water, Land and Air Protection uses WARS data to assess provincial wildlife population trends. ICBC uses WARS data for identifying highway locations where joint BCMoT/ICBC initiatives, such as exclusion fencing, warning reflectors, and infrared camera detection systems, can be targeted to reduce wildlife-related motor vehicle collisions. The success of the WARS system in British Columbia has made it a model for other agencies seeking to monitor wildlife-related motor vehicle accidents.

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The timely assembly and proofing of the WARS monthly reports, vital for keeping the WARS system current and complete, was done by Ministry's District Staff:

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WARS 1983-2002

Wildlife Accident Reporting and Mitigation in British Columbia

Special Annual Report

1.0 INTRODUCTION

1.1 Overview

The Environmental Management Section, Engineering Branch, British Columbia Ministry of Transportation (BCMoT), administers the Wildlife Accident Reporting System (WARS). WARS was designed to systematically record the location, number and type of wildlife accidents reported by BCMoT Maintenance Contractors on numbered highways in British Columbia (Map 1.1). Records in the WARS database date back to 1978 when wildlife accident data collection was originally initiated. Currently, WARS has over 78,000 wildlife accident records for a diverse range of wild animal species, including deer, moose, elk, mountain sheep, and bears.

Wildlife highway fatality

(Photo: Mike Kent)

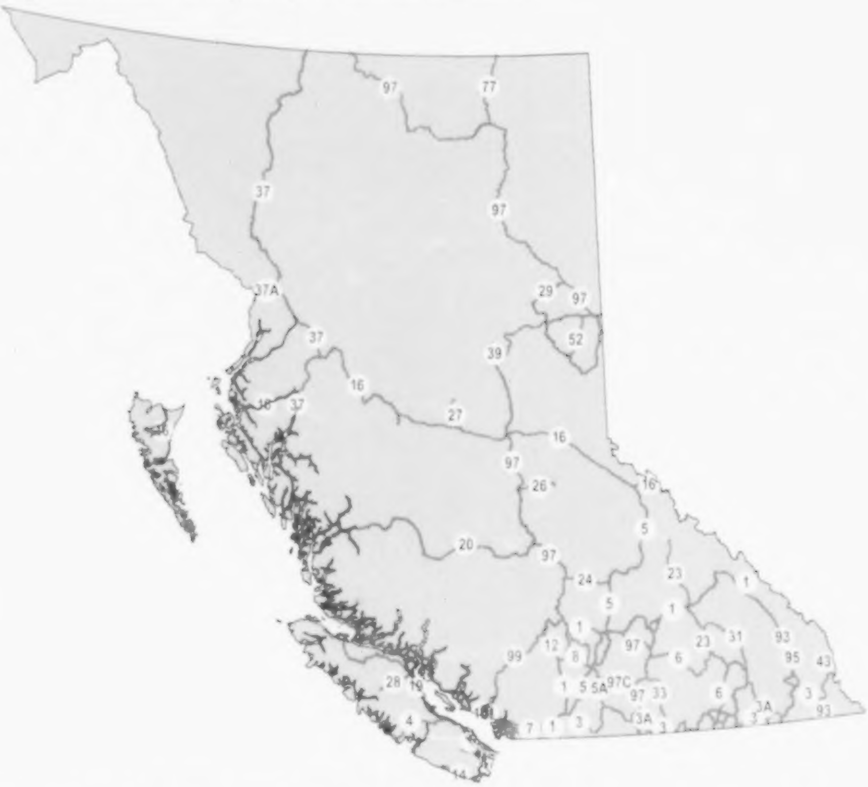
As part of its continuing efforts to protect the motoring public; stem the rising societal cost of human fatalities and injuries, motor vehicle damage, and highway maintenance; and reduce the loss of wildlife on provincial highways, BCMoT uses the WARS system to:

1. identify accident-prone locations and accident trends;
2. direct cost-effective mitigation efforts;
3. evaluate the effectiveness of mitigation techniques;
4. provide data for highway planning purposes;
5. model and forecast accidents;
6. analyze traffic and climatic relationships for species-specific accident trends;
7. develop species-specific accident risk profiles for highway corridors; and
8. establish policies and strategies for accident issues and mitigation initiatives.

As its database has grown, the WARS system has become an increasingly valuable information resource for BCMoT. Environmental management staff at BCMoT Headquarters and the Ministry's Regional Environmental Coordinators have direct access to the WARS system enabling them to provide wildlife-related motor vehicle accident information at the provincial, regional and district levels (Maps 1.2 and 1.3).

With WARS, BCMoT has been able to maximize the use and effectiveness of its existing warning system infrastructure in a manner supported by statistically significant data, and not speculation or unfounded assumptions. Monitoring accident rates and locations over time helps the Ministry identify developing problems in a timely manner. WARS also directs Ministry attention to high wildlife accident locations to reduce the operating costs of its private maintenance contractors.

Map 1.1 Numbered Highways in British Columbia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43
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19
1
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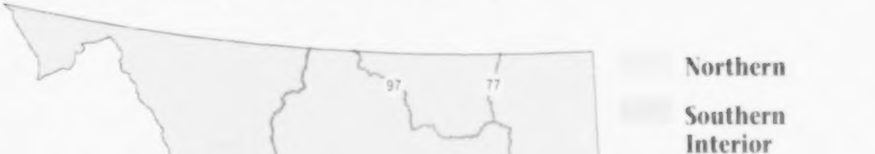
Map 1.2 Highway Regions in British Columbia


Northern
Southern Interior
South Coast
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5
20
97
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3A
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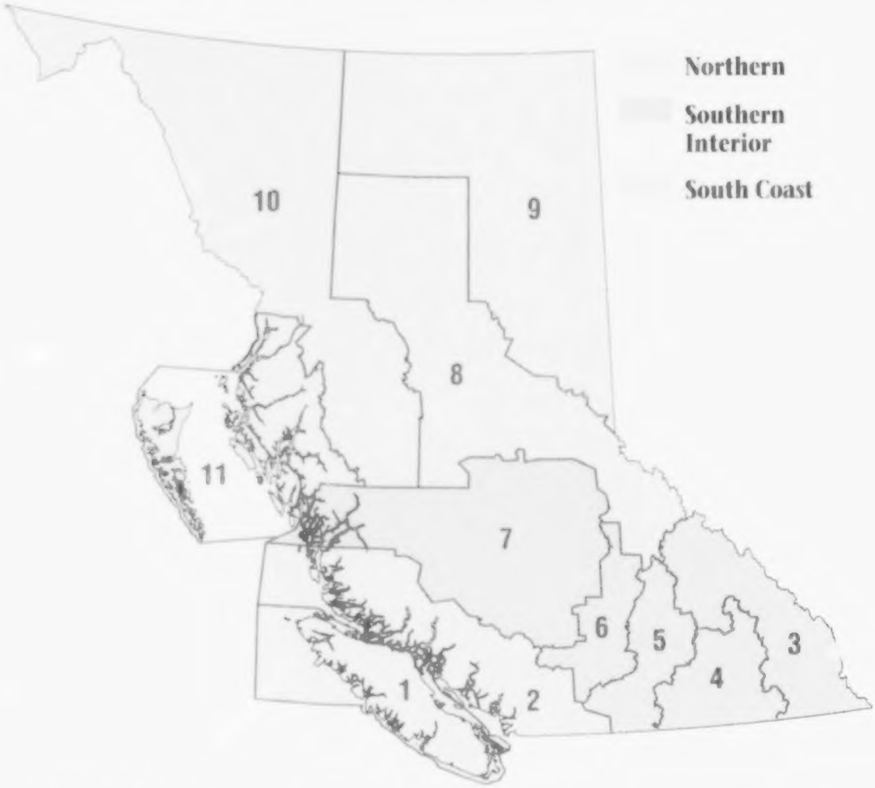
3
14



Map 1.3 Highway Regions and Districts in British Columbia

South Coast Region

1. Lower Mainland District
2. Vancouver Island District

Southern Interior Region

3. Rocky Mountain District
4. West Kootenay District
5. Okanagan-Shuswap District
6. Thompson-Nicola District
7. Cariboo District

Northern Region

8. Peace District
9. Fort George District
10. Bulkley-Stikine District
11. Skeena District

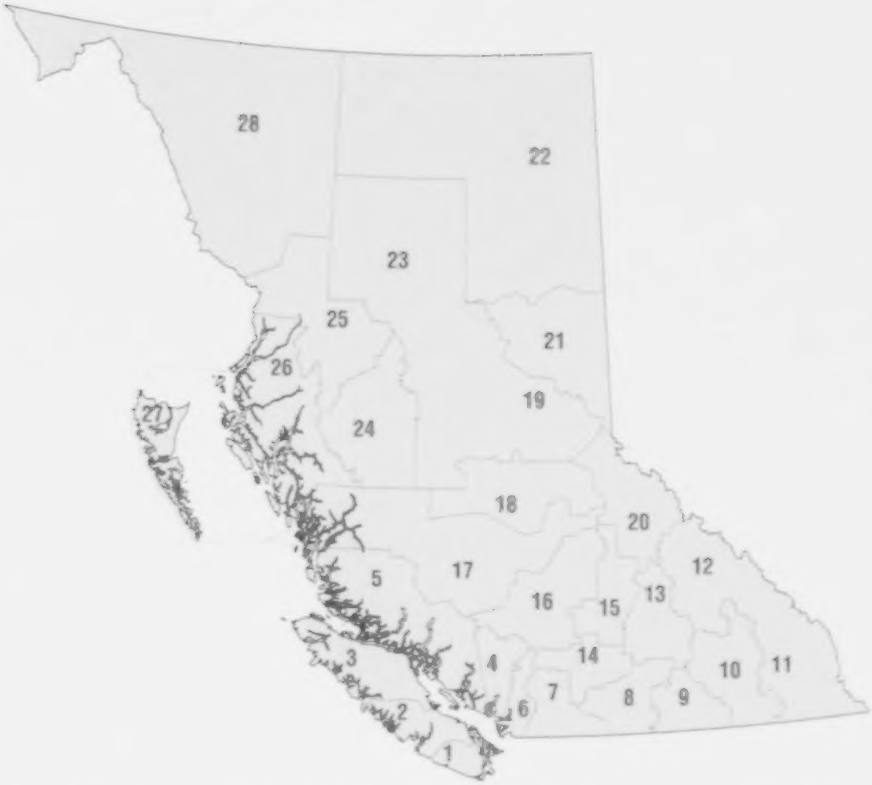
WARS, with its long established, extensive multi-species, geographically-oriented database, has proven to be invaluable to other government agencies, consultants, researchers, wildlife associations, special interest groups and members of the general public. The Ministry of Water, Land and Air Protection (MWLAP) uses WARS data to assess provincial wildlife population trends in its management units. The WARS database contains long-term wildlife-related records that cannot be assembled or extrapolated from any other information sources in British Columbia.

Whenever new technology suitable for reducing wildlife accidents becomes available, WARS data is used to support decisions for locating the technology for test purposes. The Insurance Corporation of British Columbia (ICBC), the provincial insurance carrier for motor vehicles in British Columbia, uses WARS data for identifying highway locations where joint BCMoT/ICBC initiatives can be directed. These initiatives include exclusion fencing and infrared camera detection systems targeted specifically to reduce wildlife-related motor vehicle collisions.

1.2 Methodology

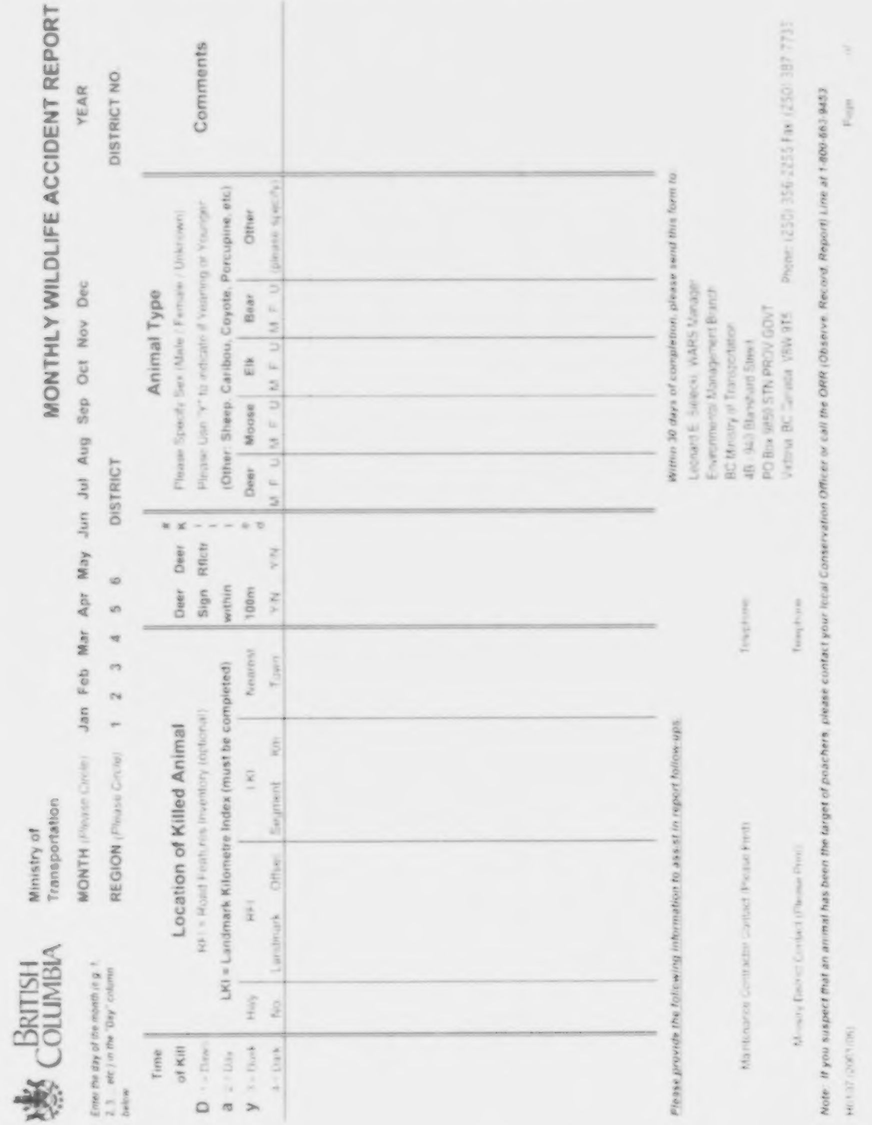
Wildlife accidents are recorded by the Ministry's Road and Bridge Maintenance Contractors located throughout British Columbia (Map 1.4). Data regarding wildlife-vehicle accidents, such as species and location, by Landmark Kilometre Inventory (LKI), are recorded on WARS forms H-107 (2001/06) (Figure 1.1). These forms are compiled by each Highway District office and then sent on a monthly basis to the Engineering Branch, HQ. The forms are screened, coded and then entered into the WARS database.

Map 1.4 BC Ministry of Transportation Maintenance Contract Service Areas



1 South Island
2 Central Island
3 North Island
4 Howe Sound
5 Sunshine Coast
6 Lower Mainland
7 Fraser Valley
8 South Okanagan
9 Kootenay Boundary
10 Central Kootenay
11 East Kootenay
12 Selkirk
13 Okanagan-Shuswap
14 Nicola
15 Thompson
16 South Cariboo
17 Central Cariboo
18 North Cariboo
19 Fort George
20 Robson
21 South Peace
22 North Peace
23 Nechako
24 Lakes
25 Bulkley Nass
26 Skeena
27 North Coast
28 Stikine

Figure 1.1 – H107, Monthly Wildlife Accident Report Form



BRITISH COLUMBIA

Ministry of Transportation

MONTHLY WILDLIFE ACCIDENT REPORT

MONTH (Please Circle) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR

REGION (Please Circle) 1 2 3 4 5 6 DISTRICT DISTRICT NO.

Enter the day of the month (e.g. 1, 2, 3... etc.) in the "Day" column below

Day	Time of Kill	Location of Killed Animal RFI = Road Features Inventory (optional) LKI = Landmark Kilometre Index (must be completed)						Deer Sign within 100m	Deer Rflctr	# Killed	Animal Type Please Specify Sex (Male / Female / Unknown) Please Use "Y" to indicate if Yearling or Younger (Other: Sheep, Caribou, Coyote, Porcupine, etc)					Comments
	1 = Dawn 2 = Day 3 = Dusk 4 = Dark	Hwy No.	RFI Landmark	RFI Offset	LKI Segment	LKI Km	Nearest Town	Y/N	Y/N		Deer M F U	Moose M F U	Elk M F U	Bear M F U	Other (please specify)	

Please provide the following information to assist in report follow-ups.

Maintenance Contractor Contact (Please Print) Telephone

Ministry District Contact (Please Print) Telephone

Within 30 days of completion, please send this form to:

Leonard E. Sielecki, WARS Manager
Environmental Management Branch
BC Ministry of Transportation
4B - 940 Blanshard Street
PO Box 9850 STN PROV GOVT
Victoria BC Canada V8W 9T5 Phone: (250) 356-2255 Fax (250) 387-7735

Note: If you suspect that an animal has been the target of poachers, please contact your local Conservation Officer or call the ORR (Observe, Record, Report) Line at 1-800-663-9453

H0107 (2001/06) Page of

WARS forms are not completed for highways maintained by the Federal Government or the Yukon Government under agreements with the British Columbia Government. These are:

Highway 1 – Glacier National Park
Highway 1 – Mt. Revelstoke National Park
Highway 1 – Yoho National Park
Highway 4 – Pacific Rim National Park,
Highway 93 – Kootenay National Park
Highway 97 – Alaska Highway (to Yukon Border)
Highway 97 – Alaska Highway (Watson Lake to Iron Creek)
Highway 1 – Alaska Highway (Morley to Swift River)
Haines Highway
Skagway Highway

1.3 Reporting

WARS is a flexible system which attempts to meet a broad range of requirements, from producing site specific reports over a few kilometres to creating detailed reports of various aspects of wildlife-vehicle accidents for the entire province. WARS data are used to produce annual reports for each calendar year and a wide range of ad hoc reports. Annual reports provide detailed information and analyses of wildlife-vehicle accidents for a given year. Multi-decade reports provide significant long term information of wildlife-vehicle accidents and examine trends such as frequency, location and magnitude of accidents. Ad hoc reports are created for people in need of specific information for particular species on selected highways. Approximately 30% of these inquiries are from BCMoT personnel. The remaining inquiries are made by other government agencies, consultants, researchers, news media, wildlife associations, and members of the general public.

1.4 Assumptions and Constraints

The Ministry estimates the number of wild animals recorded by the WARS system represents only about 25% to 35% of the actual number of wild animals killed. The low number of reports can be attributed to a number of factors. In high traffic areas, the remains of small species of wildlife, like badgers and raccoons, often become unrecognizable after being run over by a number of vehicles. Some animals, primarily deer, are removed from the roadside by passing motorists before they are recorded by BCMoT Maintenance Contractors.

Coyote remains

(Photo: BC Ministry of Transportation)

Data is also lost due to the following:

- animals die outside the highway right-of-way,
- animal remains are removed by natural predators or scavengers,
- animal remains are obscured by snow, ice, vegetation, or roadside debris,
- errors and omissions in reporting accident locations and/or species type,
- random and systematic errors and omissions in reporting and data processing, and
- process changes in reporting and data handling

WARS contains data on wildlife-vehicle accidents dating back to 1978. The data used in this report represents the data received from District offices and Maintenance Contractors by October 23, 2003.

1.5 Species Identification

While many of the Ministry's Maintenance Contractors are extremely knowledgeable about wildlife, they are not expected to be experts in species identification for WARS reporting purposes. Consequently, reporting is based largely on generic species classifications.

For WARS, white-tailed, black-tailed and mule deer are all reported as "deer", with comments on the respective Dakota Whitetail and Northwest Whitetail, Columbia Black-tailed Deer, Mule Deer, and Sitka Black-tailed Deer subspecies recorded separately, if provided by the Maintenance Contractor. Similarly, Roosevelt Elk and Rocky Mountain Elk, the North American Elk subspecies that occur in British Columbia, are both reported as "elk".

The "moose" classification includes the subspecies Northwestern Moose, Alaskan Moose and Shiras Moose. The "sheep" classification includes the Bighorn Sheep subspecies, California Bighorn Sheep and Rocky Mountain Bighorn Sheep, and the Thinhorn Sheep subspecies, Dall's Sheep and Stone's Sheep. Although, "buffalo" is the commonly used incorrect term for bison, the "buffalo" classification used in WARS includes the North American Bison subspecies, Woods Bison and Plains Bison.

The "bear" classification includes black bears and grizzly bears. In British Columbia, black bears can range in colour from black to white, with cinnamon, brown and blonde not being uncommon. The blue bear or "glacier" bear is rare.

Bison on centreline (Photo: Colin Leake)

Kermode Bear (Photo: Tom Ryan, Tourism BC)

1.6 Data Quality

The quality of the data contained in the WARS system is very dependent on the reporting diligence of the Ministry's Maintenance Contractors. Since wildlife accidents often occur at very untimely hours, under less than ideal weather conditions, comprehensive reporting at the accident scene is difficult at times.

In 2002, of the 5,031 reports received, 28% lacked valid segment numbers, and 28% lacked valid kilometre references. These reports did not contain enough information for Environmental Management Section staff to determine the valid segment numbers and km references. This represented a dramatic decline in reporting diligence from the year 2001, when, of the 5,123 reports received, only 7% lacked valid segment numbers and 10% lacked valid km references. A data quality feedback mechanism appears to be required to keep reporting quality consistent. When Wildlife Accident Report Forms are filled out correctly and consistently with the necessary LKI and km information, the value of the WARS data to the Ministry, Maintenance Contractors, and others increases.

Initially, the Maintenance Contractors' positive response to the new WARS forms H-107 (1999/01) appeared to be address the issue of data completeness and accuracy. Up until 2002, the data provided on the new H-107 forms was appeared more complete and accurate than data provided in earlier years, thus it more valuable for analysis and outcomes.

WARS data helps the Ministry direct its limited financial resources for wildlife accident mitigation to locations where it is most needed. ICBC also uses WARS data to evaluate Ministry cost-sharing proposals for highway safety projects. Since each wildlife-related accident clean-up can cost hundreds of dollars in Maintenance Contractor staff and equipment time, the WARS system can direct Ministry attention to high wildlife accident locations to reduce the operating costs for Maintenance Contractors.

1.7 WARS Enhancements

In 1994, two notable enhancements were made to the system. The first of these was expanding on the Potential Hazard reporting function of the system. In addition to Potential Hazard Reports for specified highways, the system can now also produce Potential Hazard Reports by Province, Region and District. This function can identify where accidents are most likely to occur within the area of concern whether it is a particular highway or Region. The second enhancement involved the capability of the system to report on the location of wildlife mitigation measures throughout British Columbia. WARS now contains up-to-date information on the location of wildlife fencing, reflectors and wildlife warning signs throughout the Province. In 2000, additional functions were added to the WARS system to streamline database queries and make multi-year analysis of species-specific accidents easier. To improve the accuracy and timelines of reporting and report production, the development of a web-based reporting system is underway.

1.8 Region and District Boundary Changes

As a result of significant organizational restructuring in BCMoT, major changes in the Region and District Boundaries occurred in 2002. The number of Regions was reduced from 6 to 3, and the number of Districts was reduced from 27 to 11.

In each amalgamated Region and District, the Ministry Maintenance Contractors continue to collect WARS data separately for the Maintenance Contract Service Areas that remain in the former districts. The data is merged either at Ministry District offices or at Headquarters for reporting purposes.

2.0 WILDLIFE-RELATED MOTOR VEHICLE ACCIDENT FACTORS

2.1 Identifying Factors

The highway environment in British Columbia is a very complex and varied one, ranging from multi-lane freeways located in urban centres to two-lane highways transecting the undeveloped hinterland. British Columbia has a diverse number of wild animal species and there are 133 native and 9 introduced species of mammals in the Province, ranging from seemingly ubiquitous deer to elusive wolves, each with their own highway interaction characteristics. Wildlife-related motor vehicle accidents have been recorded on highways throughout the Province. There are many related and unrelated, man-made and natural factors which may influence drivers and wildlife interactions, and affect highway conditions. Some of the factors identified, many difficult to measure and evaluate, are listed in Table 2.1.

Table 2.1 Wildlife-related Motor Vehicle Accident Factors (adapted from Sielecki, 2001)

1. Wildlife Characteristics	species, population, age, sex, stage of reproduction, nutritional needs, movement behavior, population cycles
2. Wildlife Activities	feeding, breeding, sleeping, migrating, evading predators, chasing prey
3. Natural Water Sources	intermittent and permanent streams, rivers, sloughs, lakes, ponds, springs, waterfalls
4. Man-made Water Sources	settling ponds, surface drainage systems, wells, dugouts
5. Natural Food Sources	natural vegetation, salt licks, fish-bearing waters, prey
6. Man-made Food Sources	orchards, gardens, fields, pets, livestock, garbage
7. Wildlife Shelter	caves, cliffs, forests, culverts, bridges
8. Habitat Conditions	seasonal vegetation changes, snow depth, drought, flooding, wildfire, overgrazing
9. Traffic	volume, speed, composition, time-of-day, time-of-year
10. Vehicles	size, design, operating condition, brakes, lights, horns
11. Drivers	wildlife hazard awareness, highway familiarity, general alertness, driving skill, response time, response actions
12. Highway Design	road width, number of lanes, curvilinearity of alignment, right-of-way width, shoulder width, ditch depth, pavement surface, lighting
13. Roadside Management and Maintenance	native and non-native right-of-way vegetation, weed control, mowing, brushing, ditching, snow removal, de-icing, sign and reflector repairs
14. Roadside Development	natural, urban, suburban, rural
15. Accident Mitigation Devices	wildlife signs, fencing, under/overpasses, reflectors
16. Topography	elevation, cliffs, slopes, plains, undulating terrain
17. Weather	rain, snow, sleet, fog, haze, smoke, wind, cloud cover
18. Time of Day	dawn, day, dusk, night, length of day/night
19. Lunar Cycle	phases of the Moon, intensity of Moonlight
20. Human Activities Outside Right-of-Way	construction, forestry, farming, mining, hunting, off-road recreation, controlled forest and grass fires

Deer capture (Photo: Mike Kent)

The most important factors influencing the incidence of wildlife-related motor vehicle accidents appear to be animal populations and their locations relative to highways. The population of any species will generally rise and fall in relation to their food supplies, the number of its predators, and the number of other species its predators can also prey upon. The location is also dependent on food supplies, predators and other competing species, as well as climate (i.e. snow depth) and other critical lifecycle needs (i.e. shelter for pregnant females and newly born offspring).

Radio collar on a deer (Photo: Mike Kent)

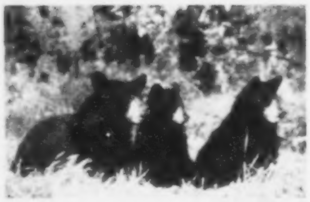
While natural population expansions and contractions occur with cyclical repetition, useful accurate information on wildlife is usually not available as the dynamics of population cycles of animals in the wild are complex (Cooper, 1998). Detailed information regarding wildlife locations and movement behavior is also often unavailable in remote or undeveloped locations.

The Ministry recognizes the need for accurate and timely information on wildlife. Consequently, before the construction of new highways or the major upgrading of existing ones occurs, the Ministry's environmental staff, aided by wildlife consultants, conduct extensive, long term, wildlife counts and tracking to locate, identify, and quantify species, as well as determine movement patterns. Depending on the species, tracking may include radio-collaring over extended periods of time.

For day-to-day operations, general information on specific species of wildlife can often be found in materials developed by various wildlife agencies. For BCMoT, the Biodiversity Branch, British Columbia Ministry of Water, Land and Air Protection (MWLAP) has been a vital source of expertise on various wildlife species.

A number of species typically found on British Columbia highways are profiled here. These profiles are intended to provide a general description on the appearance, life history, abundance and distribution of each animal for a better insight into their interaction with highways. The animals profiled are:

1. Bear (Black Bear and Grizzly Bear)
2. Caribou (Woodland Caribou)
3. Cougar
4. Coyote
5. Deer (Mule Deer, Black-tailed Deer and White-tailed Deer)
6. Elk (Roosevelt Elk and Rocky Mountain Elk)
7. Moose (Alaskan Moose, Northwestern Moose and Shiras Moose)
8. Porcupine
9. Sheep (Bighorn Sheep)
10. Wolf



2.2 Black Bear *(Ursus americanus: ssp: altifrontalis, carlottae, cinnamomum, kermodei, vancouveri)*

Appearance and Size

Black bears have a bulky body, small black eyes, a broad head, rounded ears, a short tail, and a fine, long hairy covering. Usually, their fur is uniformly black, except for a tan muzzle and a white "V" on the chest. Black bears can range in colour from black to white, with cinnamon, brown and blonde not being uncommon. A blue-coloured black bear or "glacier" bear is rare. Adult size and weight varies greatly according to sex, season, food supply, and geographic area. Adult males measure about 60 cm to 90 cm in shoulder height and 130 cm to 190 cm in length and weigh 80 kg to 300 kg. Females are smaller, weighing 40 kg to 140 kg.

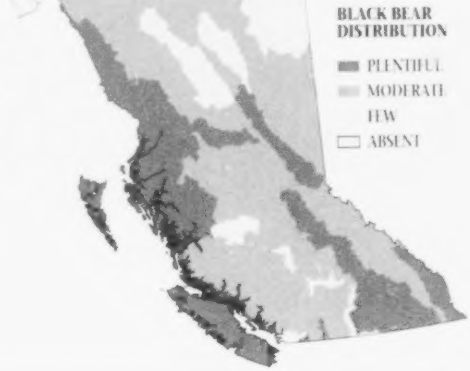
Life History

Black bears have low reproductive rates compared to many other mammals. Females typically do not reach sexual maturity until four years of age and breed only every two to three years after that. Where food is scarce, females might not bear their first litter until they are six or seven years old. Most males don't mature sexually until age five or six. Although black bears can live for 25 to 30 years in captivity, their life-span in the wild is usually much shorter. Black bears in British Columbia usually mate from early June to mid-July. Cubs are born in January or February, during hibernation. While litter sizes vary from one to five, black bears usually have two cubs. Cubs nurse while the mother continues hibernating and weigh 3 kg to 5 kg when they leave the den in spring. Cubs stay with their mother their entire first year and sometimes longer. For bears hibernation is an important survival strategy, where their main foods, green vegetation, berries, salmon and insects are not available in winter. Black bears usually hibernate for three to five months on the south coast and for longer periods (probably five to seven months) in the interior and the north. Females, in particular pregnant ones, hibernate longer than males.

Abundance and Distribution

British Columbia supports one of the largest populations of black bears in North America. Black bear numbers vary from year to year but their population in British Columbia is estimated to be between 120,000 and 160,000 bears. This is about one quarter of all black bears in Canada. One of the most widely distributed mammals in British Columbia, the black bear is found in forestland across the province. Its natural range includes Vancouver Island and most coastal islands to the north, including the Queen Charlottes. Although bears are generally absent from alpine, grassland, and heavily settled landscapes, they often are found close to the fringes of communities and sometimes wander into them. Bear numbers are higher in wet climatic zones, where vegetation is more plentiful, than in dry regions. Coastal bear densities are higher because of access to spawning salmon.

Map 2.1



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2001, *Black Bears in British Columbia*, Victoria, 6pp.

(Photo: BC Parks)

2.3 Grizzly Bear *(Ursus arctos horribilis)*

Appearance and Size

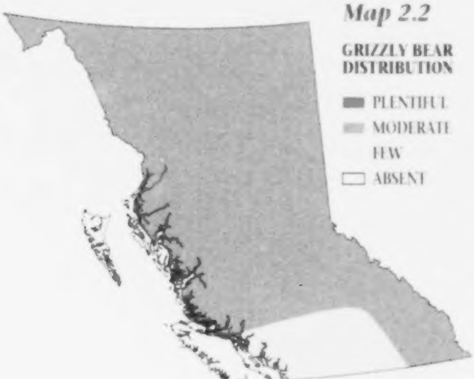
Grizzlies are large, heavy-bodied bears that can weigh up to 680 kg, with the average weight ranging from 270 kg to 360 kg. Average adult grizzlies reach nose-to-tail lengths of 1.8 m but have been recorded as long as 2.7 m. The long, outer guard hairs of the grizzly are often tipped with white, silver, or cream giving the bear the grizzled appearance its name denotes. Coat colour can be various shades of blond, brown, black, or a combination of these, and can be affected by spring shedding, growth of new hair, nutrition, and climate. Coat colour is not a good characteristic for distinguishing between black bears and Grizzly Bears. Black bears and grizzly bears sometimes look similar, but grizzlies are usually larger and are seldom completely black. Grizzlies have a prominent shoulder hump, which is lacking in black bears, and a dish-shaped face instead of the straight facial profile of the black. Grizzlies have much longer claws, adapted for digging, while black bears have shorter, curved claws, well suited for tree climbing.

Life History

Grizzly bears have one of the lowest reproductive rates of North American terrestrial mammals. Females reach reproductive maturity between four and seven years of age, and once mature, normally produce young every two to three years. The breeding season begins in late May and lasts until mid-July. The gestation period is relatively short (7 to 9 months). One to four, usually two, cubs are born in the den in January or February. The cubs will remain with the female for two or three years, during which time she does not breed. Grizzlies rarely live past the age of 25.

Abundance and Distribution

Grizzly Bears inhabit most of the province except the Queen Charlotte Islands, the Lower Mainland, and portions of the south-central interior. While they are not common on Vancouver Island, a cub was found on the northern end of the island in 2003. Grizzly Bears occur in all major biogeoclimatic areas and utilize habitats ranging from coastal estuaries to alpine meadows. Habitat use is primarily influenced by the presence of food, denning and mating sites, and other bears. Home ranges vary in size depending on the individual bear and the locality, ranging from less than fifty to hundreds of square kilometres. Coastal bears tend to have smaller home ranges than do interior bears. Home ranges of males are generally larger than those of females. Given their secretive nature, affinity for wilderness areas and low population densities, accurate counts of Grizzly Bear populations are almost impossible. Current estimates put the B.C. population at about 10,000 bears, approximately one-quarter of the North American population.



Map 2.2

GRIZZLY BEAR DISTRIBUTION

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 1994, *Grizzly Bears in British Columbia*, Victoria, 6pp.

(Photo: BC Parks)

2.4 Woodland Caribou *(Rangifer tarandus caribou)*

Appearance and Size

Woodland Caribou are classified into three ecotypes: Mountain, Northern and Boreal. The ecotypes look about the same but differ with behavior, habitat use, distribution and migration. Woodland Caribou have soft medium brown coats, but their colour pales as guard hairs break and fade during winter. In males, the head and neck are often white or greyish-white, with a mane on the underside of the neck. The tail and rump area, as well as a band around each hoof, are also whitish. Their long dense winter coat provides effective insulation against low temperatures and high winds. Caribou have erect, spreading antlers. Males have a flattened (palmate) brow tine that points down over the forehead. Female Caribou also have antlers, which is unique among females in the deer family. Woodland Caribou can range in height at the shoulder from 100 cm to 120 cm. Males typically weigh 180 kg to 270 kg while females usually weigh about 90 to 135 kg.

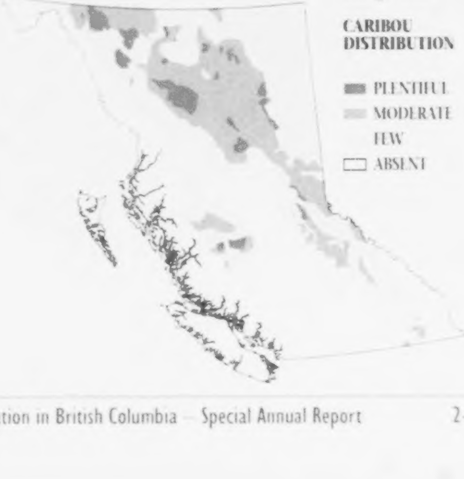
Life History

The breeding season is much shorter for Caribou than for other deer. The majority of the breeding occurs in a one-week period in the middle of October. Gestation averages seven to eight months, and calves are born in late May to early June. To avoid predators, pregnant females seek secluded sites in alpine and subalpine habitats. Single births are the most common, and females usually give birth to their first calf when they are three years old. Caribou calves are dark brown and have no spots. They are probably the most precocious of the deer family; calves must be up and travelling with their cows almost immediately in order to avoid predators. Generally, females live 10 to 15 years while males live 8 to 12 years.

Abundance and Distribution

Woodland Caribou occur east of the Coast Mountains, from the Yukon border south to the Itcha-Ilgachuz in the Western Chilcotin, eastwards to the foothills of the northern Rocky Mountains; in the Cariboo, Selkirk, Purcell, and Monashee mountains in the southeast; and throughout the highlands and plateaus (e.g. Spatsizi, Omineca) in the northern and central interior. Caribou occupy about 85 percent of their historic distribution in British Columbia. Mountain Caribou occupy about 60 percent of their historic range. Mountain Caribou may make four migrations each year, moving down to lower elevations in early winter, back up to higher elevations in late winter, down to lower elevations again in spring, and finally back to high elevations for the summer. The range of movement up and down varies, however, and the deepest snow areas, such as Revelstoke, usually have the widest range of vertical migrations. Northern Caribou migrate twice a year, traveling more than 140 km in some cases. The migration patterns of Boreal Caribou are largely unknown. British Columbia has about 16,500 Caribou.

Map 2.3



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Caribou in British Columbia*, Victoria, 6pp.

(Photo: BC Parks)

2.5 Cougar *(Puma concolor: ssp: oregonensis, missoulensis, vancouverenis)*

Appearance and Size

In British Columbia, the average adult male weighs about 46 kg and the average adult female weighs about 37 kg. Several cougar taken have weighed between 70 kg and 78 kg. Large adult males may measure 2.7 m in length, including a 76 cm tail. The fur is short and ranges in colour from reddish-brown to a grey-brown, with light underparts. Very young kittens are spotted, with ringed tails. This coloration is gradually lost as young cougar reach adulthood. Adults are unmarked. One black cougar was reported several years ago in the North Okanagan area, while white or very light-coloured cougar are infrequently reported.

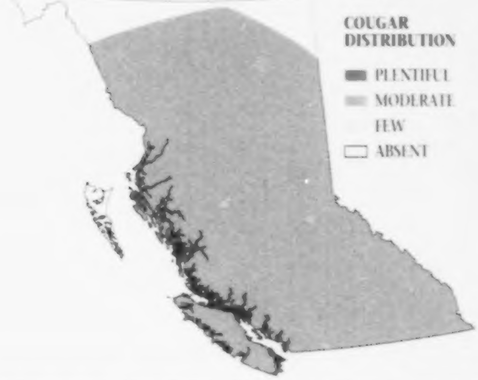
Life History

Cougar are polygamous and only the female tends the young. Females reach sexual maturity at 2 to 3 years of age. Breeding takes place at any time of the year, and one to six kittens are born after a gestation period of about 3 months. The female gives birth to her young in a rocky crevice or den, protected by roots or windfalls. Kittens are born with their eyes closed, but these open 10 to 14 days after birth. The kittens nurse for at least five to six weeks. Kittens will take meat at about six weeks of age.

Abundance and Distribution

Cougar are found throughout British Columbia. Distribution extends north from the United States/British Columbia border to the Big Muddy River on the Alaska Highway, south of about 54 degrees latitude; and from the British Columbia-Alberta border west, to and including, most coastal islands. To date, cougar have not reached the Queen Charlotte Islands. The territory or home range maintained by individual adult cougar ranges up to, or greater than, 260 km^2. The female cougar maintain winter territories of 13 km^2 to 52 km^2. Females with kittens require larger ranges than females without kittens, and some overlap of female ranges occurs. Males occupy larger territories, in the range of 65 km. Resident males do not overlap ranges. Transient cougars move through occupied ranges, but avoid resident cougar. Cougar distribution is governed by the distribution of deer, its major prey species. Summer observations are scanty, but as the snow recedes cougar probably spread out from the lower slopes and valley bottoms to inhabit virtually all elevations within their general distributional boundaries. During winter months, cougar follow deer down to the lower elevations. Cougar seem to prefer the rough, rocky, semi-open areas surrounding the major deer winter ranges in the Interior, but they do not confine their activities exclusively to this type of habitat. Cougar can be found anywhere within a game winter range.

Map 2.4



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 1994, *Cougar in British Columbia*, Victoria, 6pp.

(Photo: BC Parks)

2.6 Coyote *(Canis latrans Say: ssp: incolatus, lestes)*

Appearance and Size

Coyote fur is generally a tawny grey, darker on the hind part of the back where the black-tipped hair becomes wavy. Legs, paws, muzzle, and the back of the ears are more yellowish in colour; the throat, belly, and the insides of the ears are whiter. The tail, darker on top and lighter on the underside, is lightly fawn-coloured towards the tip, which is black. The coyote's fur is long and soft and well suited to protect it from the cold. Because it is light-coloured in winter and dark in summer, it blends well with the seasonal surroundings. The coyote's ears are wide, pointed, and erect. It has a tapering muzzle and a black nose. Unlike most dogs, the top of the muzzle on coyotes forms an almost continuous line with the forehead. The yellow, slightly slanting eyes, with their black round pupils, give the coyote a characteristic expression of cunning. The canine, or pointed, teeth are remarkably long and can inflict serious wounds. The neck is well furred and looks oversized for the body. The typical male coyote weighs from 9 kg to 23 kg, has an overall length of 120 cm to 150 cm, including a 30 cm to 40 cm tail, and stands 58 cm to 66 cm high at the shoulder. The female is usually four-fifths as large.

Life History

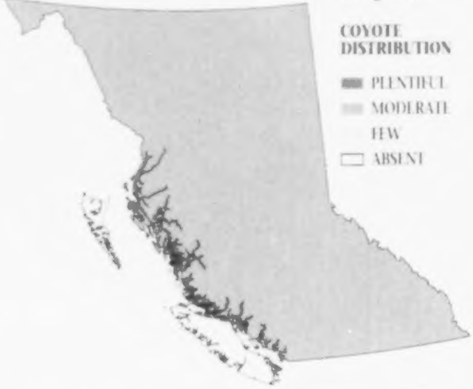
Coyotes appear to be monogamous, and couples may remain together for several years. Both sexes can breed at one year of age under good conditions, although both sexes usually breed somewhat later in life. The mating occurs mainly during February and March. Gestation lasts from 2 months. On average, the female bears three to seven pups, covered with fine brown fur, whose eyes remain closed for the first eight or nine days. Weaning, or making the transition from the mother's milk to other food, begins about one month after birth. The adults then feed the pups by regurgitating half-digested food. At about three weeks of age, the pups begin to romp around under the adults' watchful supervision. When fall comes, the young coyotes may leave their parents to claim their own territory. If there is an abundant food supply, pups may stay with the adults to form packs, or clans.

Abundance and Distribution

The coyote is one of the few mammals whose range is increasing, despite extensive persecution by people. In British Columbia, the coyote still inhabits its traditional habitats, the aspen parkland and short- and mixed-grass prairie in the Peace River. However, it has spread south and west into the mountains, and the southern and northern Interior. Coyotes are now found even in urban centres on the British Columbia Mainland, including Vancouver.

Adapted from: Canadian Wildlife Service, 1990,
Hinterland Who's Who, Mammals: Coyote,
Ottawa, Ontario

Map 2.5



(Photo: BC Parks)

2.7 Mule and Black-tailed Deer *(Odocoileus hemionus: ssp: columbianus, hemionus, sitkensis)*

Appearance and Size

Mule Deer have a reddish brown coat that changes from tawny brown in summer to dark or grizzled brown in winter. They have a dark brown forehead, a whitish face with a black muzzle, and a white throat patch. Their ears are large, about two-thirds the length of the head, with black borders and white hair on the inside. They have a large white rump patch with a narrow black-tipped tail. Each year male Mule Deer grow and shed a set of antlers. Their antlers have two main beams, each of which forks again into two beams (dichotomous branching). Mule Deer attain heights of 90 cm to 95 cm high at the shoulder. While most adult males, or bucks, weigh 68 kg to 113 kg, some may reach 180 kg. Females, or does, usually weigh between 50 kg to 75 kg. Blacktails are smaller than Mule Deer and slightly darker in color, with a small rump patch and a tail that is dark brown or black for most of its length. Adult males in good condition weigh between 48 kg to 90 kg, while females weigh between 40 kg to 65 kg. Sitka blacktails tend to be smaller and darker than Columbia blacktails.

Life History

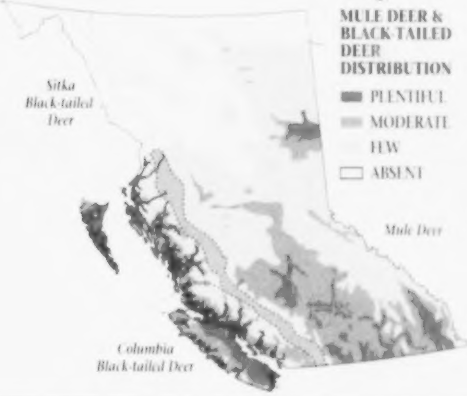
Deer are a very prolific species. Mating (rutting) occurs in late autumn, November and December. This is a time when bucks increase their displays of dominance and mature bucks engage in battles for females. Bucks are capable of breeding as yearlings, but older bucks do most of the mating. After a six to seven month long gestation period, fawns are born from late May through June. While young does often only have one fawn, twin fawns are the rule, and triplets do occur. Does usually produce offspring throughout their lives. More than 90 percent of does produce fawns every year. Usually, 45 to 70 percent of fawns die and few Black-tailed and Mule deer live more than eight to ten years.

Abundance and Distribution

Except for the rut, most Black-tailed and Mule deer tend to travel alone or in small groups. Black-tailed Deer numbers vary greatly depending on habitat conditions, winter severity, and predators numbers. Deer have adapted to all climates. They inhabit every kind of ecological zone, from alpine to valley bottom, and from dense coastal rainforests to dry interior rangelands. Deer population in recent decades has ranged between 150,000 and 300,000. Blacktails are abundant in southern areas where the climate is favourable such as Vancouver Island, the islands in Georgia Strait, and the Sechelt Peninsula. Their numbers decline northward along the mainland coast. About 150,000 black-tailed deer inhabit the coastal areas of B.C. Sitka blacktails were introduced into the Queen Charlotte Islands in the early 1900's and have flourished there. About 165,000 Mule Deer inhabit the interior of the province. While most prefer the dry valleys and plateaus of the southern interior, Mule Deer are common in the south-central interior. About 20,000 to 25,000 occupy northern ranges.

Map 2.6

MULE DEER & BLACK-TAILED DEER DISTRIBUTION



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Mule and Black-tailed Deer in British Columbia*, Victoria. 6pp.

(Photo: B. Parks)

2.8 White-tailed Deer *(Odocoileus virginianus: ssp: dacotensis, ochrourus)*

Appearance and Size

White-tailed Deer have a coat mostly reddish brown in summer but which changes to grey or greyish-brown in winter, with a contrasting white hairy covering on the belly, inside of the legs, underside of the tail, around the eyes, and on the chin and throat. The most striking feature of this deer, and the source of its name, is its triangular foot-long tail. On top, the tail is brown with a prominent white fringe, but the underside is snowy white. Whitetail bucks have distinctive antlers that fall off and grow back every year. Each antler has a main beam that rises from the top of the head, curves slightly backward, then turns out and forward over the face. Each main beam holds one to several unbranched tines, or points. Male fawns have no visible antlers, but yearlings may have either a single spike or antlers with four to eight tines. Older bucks always have several tines. Mature, White-tailed Deer stand about 90 cm tall at the shoulder. Adult males, or bucks typically weigh 68 kg to 102 kg. Adult females, or does weigh 45 kg to 73 kg. Weights vary considerably depending on age, the season, and the condition of the range.

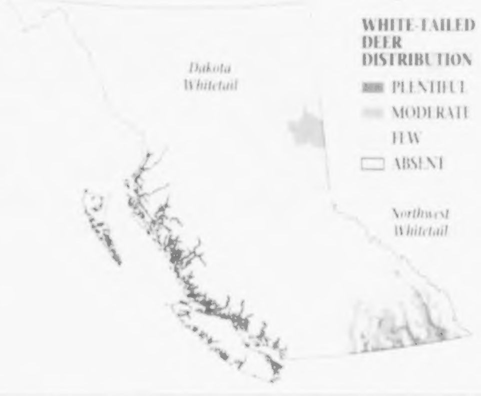
Life History

Mating (rutting) occurs in the Fall, peaking in November when most does come into heat. During the rut, bucks travel incessantly. Most breeding involves yearlings and older animals. The gestation period for White-tailed Deer is about six to seven months. After the gestation period, does drive off their young of the previous year and give birth to new fawns. Most fawns are born in late May or June. Twin births are common, but single births and triple births are not uncommon. While some whitetails live more than 20 years, few survive more than ten. Most bucks in hunted herds are less than four years old.

Abundance and Distribution

In good years, White-tailed Deer numbers may exceed 65,000 in British Columbia. Whitetails are at the far northern edge of their vast North American range and many of them die during severe winters here. However, they come back in increasing numbers if several mild winters occur in a row. This pattern is most pronounced in the Peace River region. The White-tailed Deer does not occur everywhere in British Columbia. They are most abundant along valley bottoms in the Kootenay and Okanagan regions, particularly near the US border. In the North, they are most numerous along the Peace River and the lower reaches of tributaries like the Halfway, Beatton, Moberly, Pine, and Kiskatinaw Rivers. For most of the year, valley bottoms are the main habitat for White-tailed Deer in British Columbia. In the East Kootenay area, deer find winter range on south- to southwest-facing slopes and on fans and terraces where shrub stands have developed after wildfires, logging, or land-clearing for agriculture. The distribution of Whitetailed Deer is largely governed by climate, particularly snow depth.

Map 2.7



Adapted from: British Columbia Ministry of Environment, Lands and Parks. 2000, *White-tailed Deer in British Columbia*, Victoria, 6pp.

(Photo: B. Pass)

2.9 Roosevelt Elk & Rocky Mountain Elk *(Cervus elaphus nelsoni, Cervus elaphus roosevelti)*

Appearance and Size

Elk have distinct winter and summer coats. In winter, the head, neck, and legs are dark brown, and the sides and back are a much lighter gray-brown. Adult males (bulls) tend to have a lighter, creamier body colour than adult females (cows). In summer, the coat is a rich reddish-brown, with little or no undercoat. Both sexes have heavy dark manes and a yellowish-white rump patch bordered by a dark brown or black stripe. Adult bull Elk stand about 140 cm high at the shoulder and weigh 265 kg to 410 kg. Cows stand about 130 cm high and weigh 190 kg to 270 kg. Roosevelt Elk and Rocky Mountain Elk look quite similar but Roosevelt Elk are slightly larger and darker. Mature bull Elk have rich-brown antlers, ranging in length from 110 cm to 160 cm, with ivory tips and usually five other pointed tines. Yearling bulls tend to have unbranched spike antlers.

Life History

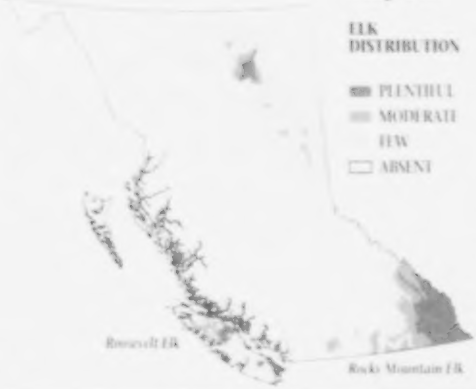
Elk are social animals. Up to 20 or more cows, calves, and yearlings live in groups that remain apart from the smaller groups of bulls, except during the autumn mating (rutting) period. As the mid-September rutting period approaches, bull Elk become more active and aggressive. They seek out the cow groups and establish harems of several cows that they jealously herd and guard. Most cows are bred from mid to late September. Elk have a gestation period of eight months. Calves are born in late May and early June. Single births are most common and twins are rare. While Elk can live as long as 20 years, most die by age 10 or 12.

Abundance and Distribution

While Elk usually live in mountainous areas, they occur both in the dense coastal old-growth rainforests and grassy interior valleys with scattered tree cover, keeping to areas where winter snows remain shallow. There are about 45,000 Rocky Mountain Elk in the British Columbia interior. About 15,000 occur in northern BC, 25,000 in the Kootenay region and 1000 in the Thompson-Okanagan area. A few hundred occur in other scattered herds. Elk are most numerous in the east and west Kootenay regions north to about Golden and west to Grand Forks. Native populations also occur along the east slope of the Rockies and adjacent foothills from the Wapiti River drainage to the Liard River, with a major concentration in the Muskwa and Tuchodi River areas. Since 1917, transplants, some from outside the province, have altered Elk distribution, supplementing some existing populations and resulting in new herds in several locations: southern Vancouver Island, the Queen Charlotte Islands, the Sechelt Peninsula, Powell River, Princeton, Lytton, Okanagan Lake, Granby River, Lower Arrow Lake, Williston Lake, and the Kechika River valley. About 3,000 to 3,500 Roosevelt Elk are located on Vancouver Island, with small herds in Phillips Arm, Sechelt and Powell River.

Map 2.8

ELK DISTRIBUTION



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Elk in British Columbia, Victoria*, 6pp.

(Photo: B. Tate)

2.10 Alaskan Moose, Northwestern Moose and Shiras Moose

(Alces alces: ssp: andersoni, gigas, shirasi)

Appearance and Size

All three moose subspecies found in British Columbia are similar in appearance. The biggest moose live in northern B.C. while the smallest ones live in the southeast. Adult bulls stand nearly 2 m tall at the shoulder and have the most massive antlers of any member of the deer family. They are larger and have longer legs, a shoulder hump, and a dark brown to blackish coat. They have no rump patch, but they have a bell of skin and hair under the throat and a large, overhanging upper lip. Adult cows weigh on average about 340 kg to 420 kg; adult bulls weigh 450 kg to 500 kg. The maximum recorded weight is 595 kg. Moose have long legs to help them travel through fallen timber, muskeg, and deep snow. Their winter coat of long guard hairs and undercoat of fine wool allows them to survive in cold climate.

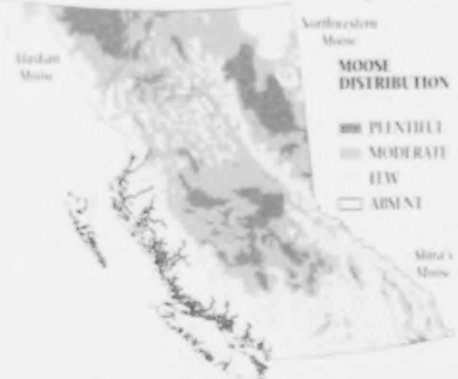
Life History

Moose are essentially solitary animals. Their only lasting social bond is the bond between mother and calf, which lasts for only a year. During that time the cows protect the calves from predators and lead them to the best habitats. In expansive northern shrublands, Moose commonly form groups of up to eight to ten during the rutting period. This habit is less common in forested habitats. Moose mate from September to November, but more than 80 percent of calves are conceived during two weeks in late September and early October. Moose have a gestation of about eight months. In late May and June, the birthing period approaches and pregnant females seek seclusion and chase away their young of the previous year. Under normal conditions, single births are generally most common. The proportion of adult cows that produce twins is closely associated with their nutritional condition.

Abundance and Distribution

Moose are one of the most widely distributed ungulates in British Columbia. Found across almost the entire interior of the province, they are most abundant in the central and sub-boreal interior, the northern boreal mountains, and the boreal plains of northeastern British Columbia. Moose are also common in mountainous valleys, except for a few dry southern valleys like the Thompson and Okanagan. Moose are not found on Vancouver Island and are usually absent from the coastal regions, but they penetrate as far as the tidewater at the heads of several inlets from Bute Inlet northward. British Columbia is estimated to have about 175,000 Moose. Over 70 percent live in northern British Columbia and the rest in the Cariboo-Chilcotin, Thompson-Okanagan, and Kootenay regions. Population densities vary greatly from place to place, mostly in response to snow depth and the supply of winter browse. Moose move about within familiar summer and winter home ranges. In a given season, their home range seldom exceeds 5 km^2 to 10 km^2.

Map 2.9



Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Moose in British Columbia*, Victoria, 6pp.

(Photo: [illegible])

2.11 Porcupine *(Erethizon dorsatum: ssp: myops, nigrescens)*

Appearance and Size

Porcupines have a short, stocky body. They have a short, blunt-nosed face with small eyes. The ears are small and round, almost concealed by the hair, which also covers the spines. The shoulders are humped, making the back look arched. The short legs are bowed, and the animal stands bear-like with its entire foot planted firmly on the ground. The claws are long and curved. The muscular tail is thick, short, and rounded at the tip.

The porcupine's coat consists of a soft, brown, woolly undercoat and coarse, long guard hairs. At the base, each guard hair is brown, becoming darker near the tip, which may be white in eastern populations and yellow in the western ones. The guard hairs conceal the quills until the porcupine is aroused. The quills are longest on the back and tail and when raised push the guard hairs forward, forming a crest. On the face the quills are about 1.2 cm long; on the back they may be up to 12.5 cm in length. There are no quills on the muzzle, legs, or underparts of the body. Next to the beaver, the porcupine is Canada's second largest rodent. Adult males reach an average weight of 5.5 kg after six years; the females reach 4.5 kg. The total length averages 68 cm to 100 cm, and the height at the shoulders is about 30 cm.

Life History

Porcupines are solitary animals. Porcupines first breed when they are one or two years old. In the southern part of their range, they mate in September. In the more northerly latitudes, they mate in late October to November. The gestation period is about 7 to 8 months. Birth occurs sometime between March and May depending how far north the porcupine is located. Single births are most common and twins are almost unknown. After a couple of days, the baby porcupine can climb, although it tends to spend more time on the ground. After a week or so, the female leaves the baby for longer and longer periods while she feeds on the emerging green plants. Weaning, or making the transition from mother's milk to other food, takes seven to ten days. By the Fall, most young porcupines live apart from their mothers.

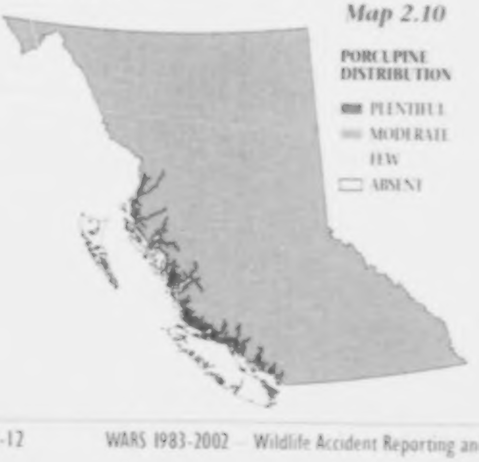
Abundance and Distribution

Except for Vancouver Island, the Gulf Islands, and the Queen Charlotte Islands, Porcupines can be found throughout British Columbia.

Adapted from: Canadian Wildlife Service, 1993, *Hinterland Who's Who, Mammals: Porcupine*, Ottawa, Ontario

(Photo: Robert [illegible])

Map 2.10



2.12 Bighorn Sheep *(Ovis canadensis, Ovis dalli: ssp: dalli, stonei)*

Appearance and Size

California and Rocky Mountain bighorns look similar, but the California subspecies is slightly darker in colour, and in rams the horns flare outward more than those of Rocky Mountain rams. Bighorn Sheep have a rich brown coat with a contrasting ivory-white rump patch, a white muzzle, and white trim on the back of all four legs. The brown coat fades to a drab grey-brown by late winter. The adult ram's massive, brown, spiralled horns grow throughout the sheep's life, and can be as long as 127 cm around the curve and as thick as 40 cm around the base. Ewes have slightly curved horns about 30 cm long. Adult rams stand about 100 cm high at the shoulder, and usually weigh 90 kg to 135 kg. Ewes are about two thirds the size of rams.

Life History

Bighorn Sheep are among the most social of British Columbia's hoofed mammals. They breed between early November and mid-December. Most ewes do not breed until they are two years old and rams until they are seven or eight years old. Gestation lasts about 6 months, and lambs are born from the last week in April to early June. As lambing time nears, pregnant ewes leave their social group and isolate themselves in rugged lambing cliffs near the winter-spring range. They usually produce a single lamb that weighs 3 kg to 5 kg, but some well-nourished females produce occasional twins. Bighorn Sheep can live as long as 20 years, but most do not live beyond 12 to 14 years.

Abundance and Distribution

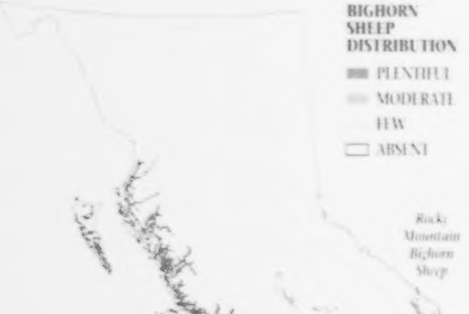
The main native herds of California Bighorns total about 3000 animals. They occur in the Okanagan area (Ashnola, Vaseaux Lake-Penticton Creek, Shorts Creek); on the east side of the Fraser River from Lillooet to Williams Lake; west of the Fraser around Churn and Lone Cabin Creeks; in the Bridge River watershed; in the Taseko Lake-Chilko Lake area; and at the Junction of the Chilcotin and Fraser Rivers. California Bighorns have been introduced in a number of locations, including the Grand Forks area, Kamloops Lake, and Dog Creek. There are about 2500 Rocky Mountain Bighorns. In the East Kootenay region, their herds occur in the Kootenay ranges on the east side of the Rocky Mountain Trench, from Radium south to Bull River; the Galton Range on the east side of the Trench from Elko to the Montana border; the Front ranges along the west side of the Elk River north of Sparwood; the west slope of the Rockies from Crowsnest Pass to Fording River; and the Kootenay River headwaters near Mount Assiniboine Park. More isolated herds also occur near Golden and north of McBride. New herds have been established near Chase, Castlegar, and Spences Bridge, which are outside of the historic range of this subspecies, and animals from an introduction in Washington State have spread into the Salmo area.

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Bighorn Sheep in British Columbia*. Victoria. 6pp.

(Photo: B. Frew)

Map 2.11

BIGHORN SHEEP DISTRIBUTION



2.13 Wolf *(Canis lupus; ssp: nubilus, occidentalis)*

Appearance and Size

Wolves in British Columbia vary in colour. A single pack may contain animals that are black, white, shades of grey-brown and tan, but never spotted. Wolf colors vary widely, and solid-colored wolves are common. They are often a grizzled grey-brown, similar to some German shepherd dogs. A wolf's winter coat is very woolly, and can be two and one-half inches thick with individual hairs as long as five inches. Dogs descended from wolves. Consequently, for some breeds, they appear similar. Wolves have longer legs, bigger feet, and a narrower chests than large domestic dogs. While a domestic dog's tail may curl, a wolf's tail does not.

Life History

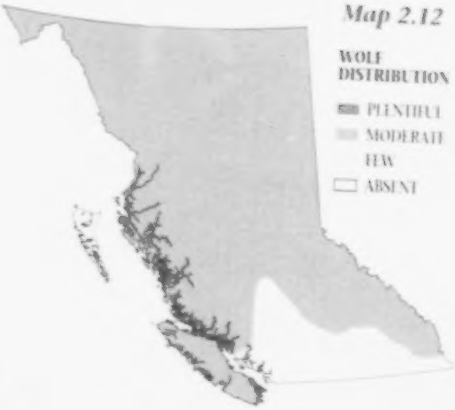
Wolves are social animals: they not only hunt in packs or groups but live most of their lives with other wolves. The wolves' habit of hunting in packs has resulted in the development of complex patterns of social behaviour. Wolves differ from domestic dogs in their reproductive cycles. Male dogs can breed at any time of year and females every six months, whereas both male and female wolves in the wild can breed only once a year. Wolves usually reach sexual maturity in their second year. It is possible for younger animals to have pups, but this is not normally the case. Breeding time varies with the latitude but most commonly occurs in March and April. After a nine-week gestation, litters of five or six pups (sometimes eight or more) are born. The pups remain inside whelping dens for approximately two weeks. By mid-autumn they are travelling with the pack and participating in hunting and other pack activities.

Abundance and Distribution

Wolves are territorial. The sizes of their territories vary greatly and are dependent on the kind and abundance of prey available. The pack bond is strongest during winter, when the wolves travel and hunt together. In summer, when the pups are young, the adults seldom go on long forays. They may hunt together occasionally after meeting at the den or home site where the pups are being cared for. Wolves are common in lightly settled portions of British Columbia.

Adapted from: Canadian Wildlife Service, 1993, *Hinterland Who's Who, Mammals: Wolf*, Ottawa, Ontario and National Park Service, 2004 Wolves in the North Cascades, North Cascades National Park, Sedro Woolley, Washington.

(Photo: W. Paxs)



Map 2.12

3.0 COST OF WILDLIFE-RELATED MOTOR VEHICLE ACCIDENTS

3.1 Wildlife-related Motor Vehicle Accidents

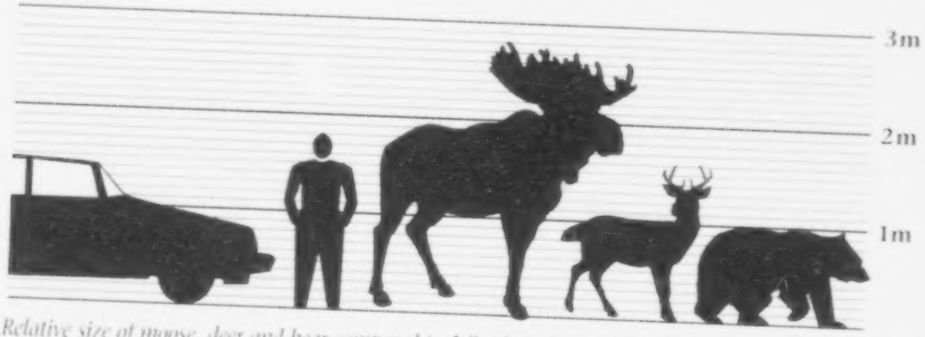
The cost of wildlife-related motor vehicle accidents to the residents of British Columbia is substantial. The financial impact on the province can be broken down into the following:

- Reported Accidents
- Unreported Accidents
- Accident Clean-up
- Lost Provincial Hunting License Revenues
- Lost Value of Wildlife

3.2 Reported Accidents

In addition to killing wildlife, wildlife-related motor vehicle accidents represent a serious threat to the motoring public. Accidents involving large ungulates and carnivores can result in human fatalities, injuries, and damage to motor vehicles (Figure 3.1 & Table 3.1). Any accident may also result in multiple human fatalities.

Figure 3.1



Relative size of moose, deer and bear compared to 1.8m human and mid-sized automobile.
(Adapted from Maine Interagency Work Group on Wildlife/Motor Vehicle Collisions, 2001)

Table 3.1 Wildlife-related Fatal, Injury and Property Damage Only Accidents

Year	Fatal Accidents	Total Number of Deaths	Injury Accidents	Property Damage Only Accidents
1987	1	1	198	2,226
1988	0	0	256	2,596
1989	1	3	199	2,590
1990	1	1	237	2,821
1991*	1	2	241	1,925
1992	2	6	238	1,975
1993	0	0	248	1,954
1994	3	9	256	2,072
1995	3	5	221	1,678

**Note: In 1991, the minimum reportable aggregate property damage accident value increased from $400 to $1000. Source: Highway Accident System, Highway Safety Section, Engineering Branch, BCMoT*

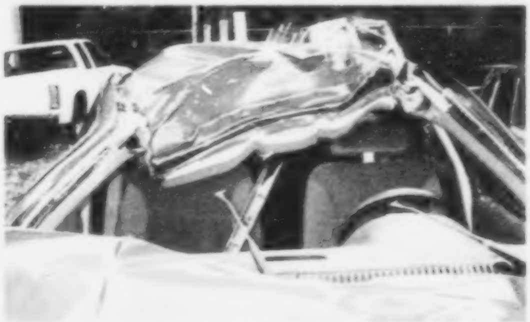
In British Columbia, the majority of motor vehicles are insured by the Insurance Corporation of British Columbia (ICBC). On average, ICBC processes approximately 6600 wildlife-related accident claims a year . In 2000, the average cost of these claims was about $2200. Between 1997 and 2002, ICBC paid out over $144.5 million in animal-related motor vehicle accident claims (Table 3.2). In 2000, ICBC had over 8,800 wildlife-related accident claims.

Table 3.2 ICBC Animal-related Motor Vehicle Accident Claims (1997 to 2002)

	1997	1998	1999	2000	2001	2002	Total
Claims ($millions)	17.9	19.9	21.3	26.3	28.3	30.8	144.5

Source: Insurance Corporation of British Columbia, 2004

ICBC estimates its accident claims capture 75% of the number of wildlife-related accidents that occur in British Columbia. Few people in British Columbia do not carry comprehensive insurance. With ICBC insurance policies, there is no penalty for a comprehensive claim so such claims do not affect policy premiums. Of the 25% of the number of British Columbia wildlife-related motor vehicle accidents ICBC estimates go unreported to it, ICBC estimates 10% involve out-of-province vehicles, 10% involve vehicles with less than $100 in damage, and 5% of the accidents are reported to other insurance companies in British Columbia.



Vehicle damage from accident with elk (Photo: Deborah Webster)

Wreckage from vehicle accident with elk (Photo: Deborah Webster)

The societal costs of motor vehicle-related accidents have also been estimated by the British Columbia Transportation Financing Authority and the impact to the Province is considerable (Table 3.3).

Table 3.3 Societal Costs of Motor Vehicle Accidents (BCTFA)

Accident Severity Class	Societal Cost
Fatality	$4.17 million
Injury	$97,000
Property Damage	$6,000

Source: Highway Safety Improvement Program Manual, BCMoT

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1 Gilfillan, G., 2001 Personal Communication, Project Manager, Winter Road Research & Development, Kamloops, B.C.

2 Perkins, M., 1999, Highway Safety Improvement Programs Manual, British Columbia Ministry of Transportation

3.3 Unreported Accidents

Except for fatal accidents, not all wildlife-related motor vehicle accidents which occur in British Columbia are reported in the province. Some accidents involve tourists or visitors from outside British Columbia. In such cases, many wildlife-related accidents are reported in other jurisdictions. Other accidents involve minor damage vehicle owners either ignore or pay for the repairs privately.

If one assumes the 6600 accidents reported to ICBC represent 75% of the actual number of vehicle damaging, wildlife-related accidents that occurred on Provincial highways, one can estimate an additional 1650 vehicles were damaged in wildlife-related accidents.

If one assumes these motor vehicles accidents incurred an average of $2300 in damages, the total unreported damage incurred by motor vehicles in British Columbia in 2002 totaled $3.8 million.

3.4 Accident Clean-up

Ministry Maintenance Contractors incur costs due to staff and equipment time required for the clean-up of wildlife-related accidents and the disposal of animal remains. Depending on the size of the animal involved and the location of the accident, the cost of clean-ups can vary dramatically. While smaller animals, such as porcupine and skunks, may be handled by a single person in one vehicle, larger animals, such as moose, elk, and caribou, often require two or three people with two vehicles and a hydraulic boom.

If one assumes the following staff and equipment time costs:

- $25 for small-sized animals (fox, porcupine, skunks, etc),
- $100 for medium-sized animals (bear, cougar, deer, mountain sheep, etc), and
- $350 for large-sized animals (caribou, elk, moose, etc);

Ministry Maintenance Contractors spent over $600,000 dealing with wildlife-related accident clean-up and disposal in 2001. Between 1993 and 2002, it is estimated Ministry Maintenance Contractors spent over $5.6 million on wildlife-related accident clean-up and disposal. These expenditures do not include the costs incurred by the Maintenance Contractors for insurance premiums and lost employee productivity or the Workers' Compensation Board for compensation payments when workers get injured dealing with wildlife-related accidents.

Accident clean-up

(Photo: Alan Dibb)

3.5 Lost Provincial Hunting License Revenues

In British Columbia, hunting license sales generate millions of dollars for the Provincial Government each year. The value of hunting licenses varies greatly between species and whether or not the hunter is a British Columbia resident (Table 3.4).

If every wild game animal reported killed on provincial highways represented an opportunity to sell a hunting license, the Province of British Columbia lost between $75,000 and $610,000 in hunting license revenues in 2001. If a 3 to 1 factor of unreported to reported animals killed is used, the Province of British Columbia could have lost between $300,000 and $2.45 million in hunting license revenues in 2002.

Hunter with deer

(Photo: Bolten Studios)

Table 3.4 Provincial Hunting License Fees for Residents and Non-residents

Species	Resident fees ($)	Non-resident fees ($)
Bison	70	700
Black Bear	20	130
Bobcat	8	40
Caribou	20	230
Cougar	30	230
Deer	15	125
Elk	25	200
Grizzly Bear	80	1,030
Lynx	8	40
Moose	25	200
Mountain Goat	30	275
Mountain Sheep	50	400
Wolf	No Licence	50
Wolverine	8	40

Source: British Columbia Ministry of Water, Land and Air Protection (MWLAP), 2003

3.6 Lost Provincial Trapping Royalties

In British Columbia, trapping royalties generate thousands of dollars for the Provincial Government each year. The value of trapping royalties vary greatly between species. (Table 3.5)

Table 3.5 Schedule of Trapping Royalties per Pelt or Skin

Species	Royalty ($)
Bison & Beaver	0.77
Black Bear	3.45
Bobcat	1.34
Coyote	0.72
Fisher	1.16
Fox	0.66
Lynx	2.46
Marten	1.15
Mink	0.52
Muskrat	0.07
Otter	2.77
Raccoon	0.40
Skunk	0.08
Squirrel	0.05
Weasel	0.15
Wolf	2.69
Wolverine	6.53

Source: British Columbia Ministry of Water, Land and Air Protection (MWLAP), 2002

If every furbearing wild game animal reported killed on provincial highways represented an opportunity to collect a fur royalty, the Province of British Columbia lost over $4,600 royalty revenues between 1993 and 2002. If a 3 to 1 factor of unreported to reported animals killed is used, the Province of British Columbia could have lost over $18,700 between 1993 and 2002.

3.7 Lost Value of Wildlife

The Wildlife Branch of the British Columbia Ministry of Water, Land and Air Protection (MWLAP) has done extensive analysis of the economic value of wildlife resources in the province.[3] In British Columbia, participants in hunting and viewing make estimated current expenditures of about $466 million each year that are directly associated with their wildlife-related recreation.

The expenditures by participants in wildlife-related activities and their impacts on income and employment are spread throughout the Province and make important contributions to many rural economies. In 1996, MWLAP estimated expenditures on resident hunting and wildlife activities supported about $205 million of Provincial Gross Domestic Product and $136 million of household income.

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[3] Reid, R., 2001 Personal Communication. Economist British Columbia Ministry of Water, Land and Air Protection (MWLAP), Wildlife Program, Victoria, BC.

[4] Ibid.

3.8 Lost Value of Wildlife for Resident and Non-resident Hunters

Approximately 100,000 British Columbia residents purchase hunting licenses annually and spend an estimated 1.5 million days hunting in the province each year.[5] Approximately 4,500 non-residents spend about 46,000 days hunting in British Columbia each year.[6]

One measure of the value of wildlife lost due to motor vehicle-related accidents can be estimated by determining how much hunters are willing to pay to hunt.

MWLAP surveyed thousands of resident hunters in 1996 to determine their "willingness to pay" in order to obtain an animal from a certain species (Table 3.6). According to MWLAP, the "willingness to pay" by British Columbia hunters to obtain a certain species of animal can be considered the equivalent of the "true net market value" of that species. For non-resident hunters, the "net return" to the Province is determined to be the value of their expenditures less the cost to the Province for supplying the services they need.

Table 3.6 Resident and Non-resident Hunters Net Value to British Columbia

	Net Value to British Columbia	
Species	**Resident Hunters ($)**	**Non-resident Hunters ($)**
bear	950	2,340
caribou	2,960	2,930
cougar	2,050	3,400
deer	1,270	7,450
elk	3,250	3,290
moose	1,250	1,680
mountain sheep	4,700	4,170

Source: British Columbia Ministry of Water, Land and Air Protection (MWLAP), Wildlife Program

For every wild game animal reported killed on provincial highways in 2002, the Province of British Columbia would have earned over $6.1 million in the market value of the animals to resident hunters. If a 3 to 1 factor of unreported to reported animals killed is used, the Province of British Columbia would have lost over $24.5 million from resident hunters in 2002.

The value of non-resident hunting in British Columbia is significant. Non-resident hunters contribute to the provincial economy by purchasing hunting licenses and supplies, and hiring hunting guides. If every wild game animal reported killed on provincial highways represented an opportunity for non-resident hunters to hunt in the Province, the Province of British Columbia would have lost over $30.3 million in net returns in 2002. If a 3 to 1 factor of unreported to reported animals killed is used, the Province of British Columbia would have lost over $121.4 million in net returns from non-resident hunters in 2001.

The true market value of wildlife may be more accurately determined by public auction, but only if all hunting opportunities were auctioned. As a fund raising initiative supported by the Alberta Provincial Government, the Rocky Mountain Elk Foundation has auctioned one non-resident elk hunting permit ("tag") and one non-resident bighorn sheep tag between 1995 and 2004. The successful bids on the tags are shown in Table 3.7.

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[5] Reid, R., 2001 Personal Communication. Economist British Columbia Ministry of Water, Land and Air Protection (MWLAP) Wildlife Program, Victoria, B.C.

[6] Ibid

[7] Ibid

Table 3.7 Rocky Mountain Elk Foundation Elk and Bighorn Sheep Non-Resident Tag Auction Results

Auction Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Elk tag (non-resident)	$20,800	$19,870	$18,200	$20,874	$26,265	$30,519	$24,585	$30,854	$34,544	$20,035
Bighorn Sheep tag (non-resident)	$315,000	$231,506	$236,232	$607,500	$495,000	$290,660	$276,588	$356,323	$301,080	$194,417

Source: Arychuk, D., 2004, Personal Communication, Rocky Mountain Elk Foundation, Edmonton, Alberta

Since 2000, the British Columbia Ministry of Water, Land and Air Protection (MWLAP) has auctioned off mountain sheep hunting licenses in Reno, Nevada (Table 3.8).[8] The auction is used as a fund raising initiative for the British Columbia Habitat Conservation Trust Fund (HCTF) to help support mountain sheep management[9].

Elk

(Photo: Tourism BC)

Table 3.8 MWLAP Bighorn Sheep Tag Auction Proceeds for the HCTF

Auction Item	2000	2001	2002	2003
Bighorn Sheep tag (non-resident)	$215,250	$152,626	$134,768	$154,313

Source: McDonnell, K., 2004, Personal Communication, British Columbia Ministry of Water, Land and Air Protection

The Rocky Mountain Elk Foundation has also auctioned off mountain sheep hunting licenses for Alberta residents (Table 3.9). The auction results are indicative of what a Canadian may be willing to pay for an elk or bighorn sheep hunting opportunity.

Bighorn Sheep

(Photo: Mike [illegible])

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[8] Reid, R., 2002 Personal Communication, Economist British Columbia Ministry of Water, Land and Air Protection (MWLAP) Wildlife Program, Victoria, B.C.

[9] Ibid.

Table 3.9 Rocky Mountain Elk Foundation Elk and Bighorn Sheep Alberta Resident Tag Auction Results

Auction Item	1998	1999	2000	2001	2002	2003
Elk tag (resident)	$9,560	$8,690	$10,500	$10,510	$12,290	$8,050
Bighorn Sheep tag (resident)	$16,490	$16,650	$24,500	$25,000	$39,090	$22,140

Source: Arychuk, D., 2004, Personal Communication, Rocky Mountain Elk Foundation, Edmonton, Alberta

Although the successful bids in the auctions for British Columbia and Alberta wild game animals continue to be considerably higher than the value MWLAP has generally determined for these types of animals, the auction results show certain species wildlife are considered very valuable by some hunters. One should note these auction results are extreme values and they are not representative of typical hunter values.

3.9 Lost Value of Wildlife for Non-hunting Residents

No species-specific figures are available for the value of wildlife to non-hunting residents.[10] Regardless, the presence of wildlife generates considerable economic activity in British Columbia. MWLAP estimates 863,000 provincial residents spent 18 million days in direct wildlife activities with the main purpose of watching, photographing, feeding and studying wildlife in the field in 1996.[11]

The impact of motor vehicle-related accidents on wildlife species with critically low populations can have serious implications on wildlife viewing activities. Species, such as mountain goats and mountain sheep, which attract viewing attention, have low reproduction rates and limited areas of habitat. Consequently, the loss of even a few members of a small herd in motor vehicle-related accidents can threaten the survival of the herd and reduce the long-term provincial economic benefits generated by residents viewing the herd.

Dead mother bear and cubs

(Photo: Sylvia Campbell)

MWLAP estimates British Columbia residents participating in direct wildlife activities, where the main purpose of a trip was to see wildlife in the field, spent almost $392 million in 1996, contributing over $174 million to the Provincial Gross Domestic Product.

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[10] Reid, R., 2001 Personal Communication, Economist British Columbia Ministry of Water, Land and Air Protection (MWLAP), Wildlife Program, Victoria, B.C.

[11] Ibid

3.10 Injured Wildlife and Orphans

In addition to the loss of wildlife as a result of motor vehicle-related accidents, there are other issues which arise, in particular the welfare of injured animals and orphaned offspring.

Injured Wildlife

While the most severely injured animals are euthanized as humanely as possible by conservation officers of the British Columbia Ministry of Water, Land and Air Protection or law enforcement personnel, most often the Royal Canadian Mounted Police in rural areas, the recovery of less severely injured wildlife is a growing concern in British Columbia.

Wildlife accident fatality – Elk (Photo: Brent Persello)

In British Columbia, wildlife rehabilitation requires a specific permit to possess, treat, release, and euthanize if necessary, wildlife. In general, to obtain a permit for a designated rehabilitation facility there must be a need in the community for such services and the individuals must have approved facilities for the species to be admitted, demonstrated training or experience, an established relationship with a veterinarian, liability insurance, and submit annual records of all wildlife treated. Individuals can also apply for permits to temporarily house and transport wildlife to designated rehabilitation facilities. Annual permits for B.C. rehabilitators are administered by Federal and Provincial agencies.

The Wildlife Rehabilitators Network of British Columbia, a non-profit volunteer-run organization, was founded in 1989 to assist in the recovery of injured wild animals, including those involved in motor vehicle accidents. The Network's membership includes licensed rehabilitation facilities and individual rehabilitators, rehabilitation volunteers, wildlife researchers, government and humane association representatives, veterinarians and other animal care personnel, and interested members of the public. (Appendix 1) The Network has provided valuable assistance to injured wild animals.

Orphaned Offspring

Black bear cubs (Photo: Tourism BC)

One of the most heart rendering impacts of wildlife accidents is the orphaning of young offspring when adult females are killed. Of the orphaned wildlife species, orphaned bears have received the closest attention by the BC Provincial Government. The majority of orphaned bear cub occurrences involve Black Bears as British Columbia has one of the largest populations of Black Bears in North America. Although the Province has the second largest population of Grizzly Bears in North America, orphaned Grizzly Bear cubs are encountered less often.

Mother bear with cub

(Photo: Chad Jeffrey)

At present, there are no approved programs or protocols in North America to re-introduce orphaned grizzly bears cubs back into the wild. Upon the loss of their mother, most often due to human related activity, orphan grizzlies cubs are either reluctantly destroyed by conservation officers or relegated to a life in captivity (Macquisten, K. 2004). Historically, Provincial policy in British Columbia required that orphaned bears cubs be euthanized. Existing provincial policy states that orphaned bear cubs are not good candidates for translocation and should be killed in all situations. This policy exists for the following reasons:

- orphaned bear cubs are believed to be unlikely to survive and to be successful on their own if left in the wild;
- large predators such as bears are difficult for wildlife rehabilitators to deal with in captive environments;
- there is a public safety concern regarding the release of large and potentially dangerous predators that have been raised in a captive environment, if they rely on humans for food and lose their fear of people;
- there is a lack of agreement in the scientific community on whether bear rehabilitation is successful in returning bears to the wild; and,
- Black Bears are not a species of conservation concern and the Ministry of Environment, Lands and Parks has limited resources. These resources are more appropriately aimed at managing species that are at risk.

Despite this policy, however, Conservation Officers, wildlife staff or members of the public took 102 bears to rehabilitation facilities between 1990 and 2000, with the majority of these bears being cubs. There are a complex set of reasons leading to Conservation Officers placing bear cubs in rehabilitation facilities, including the public interest in this procedure, a change in some regional policy direction on this issue, more wildlife rehabilitators becoming interested, and the development of bear cub rearing and rehabilitation protocols in the U.S. (Orphan Bear Cub Review Committee, 2000)

To deal with this difficult situation, and to address public concerns, the British Columbia Ministry of Water, Land and Air Protection has been reviewing its policy and procedure on the handling of orphan bear cubs.

4.0 WILDLIFE-VEHICLE ACCIDENT MITIGATION METHODS

4.1 Overview

Since the mid-1980s, the Ministry has been one of the pioneers and leaders in the field of wildlife–vehicle accident mitigation. The Ministry Methods utilized by the Ministry of Transportation to reduce wildlife vehicle accidents are pursued with multi-faceted objectives. The Ministry strives to reduce, and ultimately eliminate human and wildlife deaths and injuries, and motor vehicle and property damage; as well as increase public awareness and ensure mitigation techniques are cost effective. The mitigation methods employed by the Ministry include:

1. Habitat and Right–of–Way Modification
2. Wildlife Warning Signs
3. Reflectors
4. Wildlife Passage Structures
5. Wildlife Exclusion Fencing
6. Integrated Wildlife Management
7. Transfers and Relocation

4.2 Habitat and Right-of-way Modification

The habitat of rural and semi-rural highways and rights-of-way is intrinsically attractive to wildlife. Given the topography in British Columbia, highways are often located in areas where wildlife naturally congregate, especially during winter, such as valley bottoms and near lakes and rivers. Also many ungulates, in particular deer, prefer to travel along open areas close to cover, which represents the typical highway rights-of-way in British Columbia. Moose are often found feeding along highways adjacent to bogs and marshes.

Traditionally, the Ministry used a variety of agricultural type seed blends to reseed right-of-way areas, after road construction, to prevent soil erosion. Although effective for their intended purpose, some seed blends, particularly those containing legumes such as clovers and alfalfa, appear to attract animals to the roadside.

Stone Sheep feeding at shoulder

(Photo: Shepherd M.)

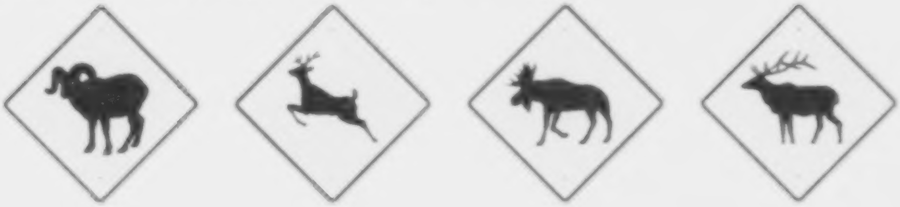
In order to deter this, the Ministry has been adjusting its seed mixes in problem areas to remove the plant types which are known to attract animals. The Ministry is also examining the potential of non-toxic, biodegradable systemic fertilizers and repellents which make roadside plants taste and smell less desirable to ungulates.

Currently, BCMoT is working closely with ICBC and the University of Northern British Columbia on a vegetation-related moose accident reduction project near Prince George. The Ministry is reviewing the potential of timed brushing and mowing in an effort to reduce the attractiveness of roadside vegetation for moose foraging.

4.3 Wildlife Warning Signs

As a consequence of addressing the potential motoring hazard created by the large number of difference species that inhabit British Columbia, the Ministry has developed one of the most comprehensive species-specific wildlife warning sign inventories in the world. (Figure 4.1)

Figure 4.1 – Examples of BC MoT Wildlife Warning Signs

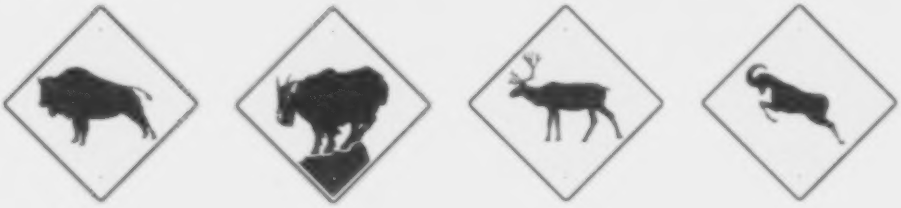


A
Big Horn Sheep

B
Deer

C
Moose

D
Elk

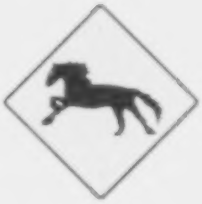


E
Buffalo

F
Mountain Goat

G
Caribou

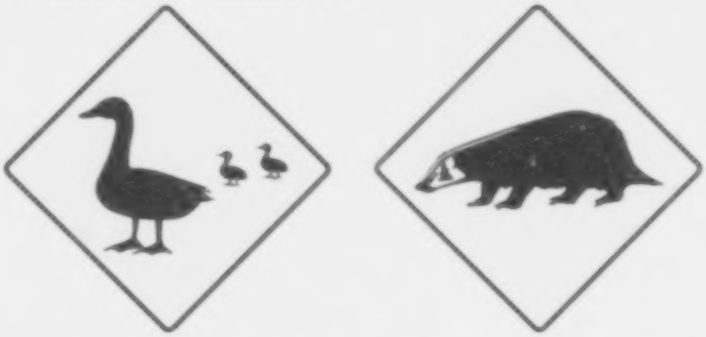
H
Ram



J
Wild Horses

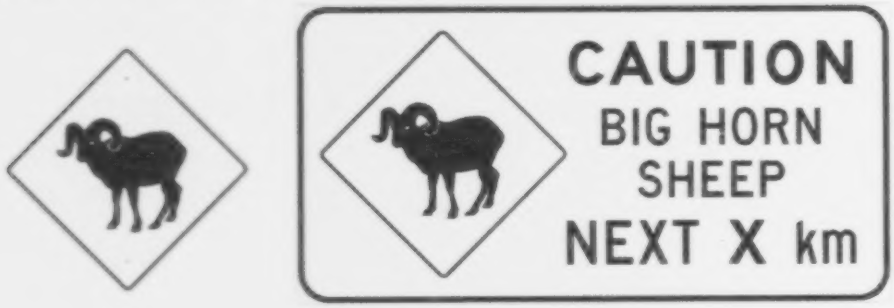
New signs are developed by the Ministry as it becomes aware of the need for such signs as part of its ongoing efforts to keep the motoring public aware of potential wildlife hazards as they are identified. In 2003, the Ministry developed signs for ducks and badgers in response to requests by wildlife preservation groups (Figure 4.2). The signs were immediately put into use.

Figure 4.2 - New BC Wildlife Warning Signs



Wildlife warning signs are the Ministry's most commonly used wildlife-vehicle accident mitigation measure because they are the least expensive and easiest to install and maintain. Standard sized signs (75 cm x 75 cm) cost approximately $150 while oversized signs (244 cm x 122 cm) cost approximately $550 (Figure 4.3).

Figure 4.3 – Standard and oversized signs



75cm x 75 cm

244 cm x 122 cm

warning signs and motorist awareness of wildlife hazards, the Ministry recently developed a high level warning sign to indicate when a wildlife hazard is imminent or when the historic wildlife collision rate is extreme. These signs are particularly useful for addressing short-term and seasonal use for migration events, and other unique wildlife activities, such as salt licking on roads by mountain sheep.

Badger Crossing sign

(Photo: Richard Klafki)

Elk warning signs

(Photo: Leonard Sielecki)

WATCH FOR WILDLIFE
USE CAUTION

Overhead digital sign

(Photo: Mike Kent)

Bighorn Sheep licking salt

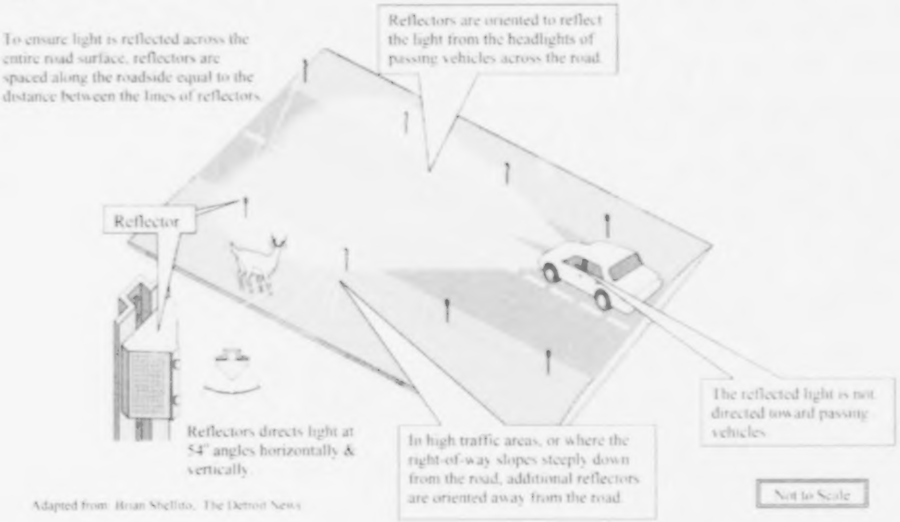
(Photo: Leonard Sielecki)

The Ministry is currently examining the potential use of WARS data for establishing seasonal, species-specific warning messages on its changeable message signs located throughout the Province.

4.4 Reflectors

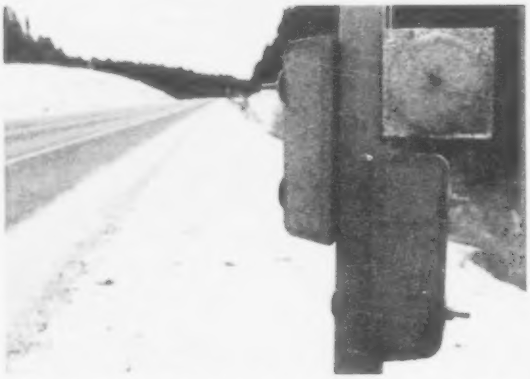
The Ministry has been installing and evaluating wildlife warning reflectors since the 1980's as part of its continued effort to reduce wildlife-related accidents. The Ministry has one of the most extensive reflector installations in North America. BCMoT installs the same types of Swarflex and Strieter-Lite reflectors used by transportation agencies in North America and Europe. The reflectors are prisms mounted on posts and installed along the sides of the highway as a means of deterring animals from entering the highway when vehicles are present. At night, as the headlights of an approaching vehicle strike the reflectors they reflect beams of light at ninety-degree angles to the roadway. (Figure 4.4) The concept behind reflectors is that reflected light apparently catches the attention of animals and distracts them long enough to delay their movement onto the road until the vehicle has passed.

Figure 4.4


To ensure light is reflected across the entire road surface, reflectors are spaced along the roadside equal to the distance between the lines of reflectors.
Reflectors are oriented to reflect the light from the headlights of passing vehicles across the road.
Reflector
Reflectors directs light at 54° angles horizontally & vertically.
In high traffic areas, or where the right-of-way slopes steeply down from the road, additional reflectors are oriented away from the road.
The reflected light is not directed toward passing vehicles.
Not to Scale

Adapted from: Brian Shellito, The Detroit News

Reflectors cost approximately $10,000/km to install along both sides of a highway. Maintenance costs range in the order of $500 to $1,000 annually. Reflectors require regular cleaning and alignment. Reflectors have been the targets of theft and vandalism. Locating reflectors in suitable locations along highways is essential to avoid creating new problems for regular highway maintenance.



Reflectors during winter conditions

(Photo: [illegible])

To date, reflectors have been installed at over 95 locations throughout the Province. (Table 4.1) The reflectors have been installed on either one side or both sides on over 160 km of highway. Reflectors have been extensively used in the Interior of British Columbia along highways prone to high numbers of deer-related accidents. The general locations of the reflector installations are shown on the Maintenance Contract Area maps. Reflectors have been extensively used in Region 2 along highways prone to high numbers of deer-related accidents.

Table 4.1 – Wildlife Warning Reflector Locations (April 2004)

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
1	1	3	1305	64.2	66	1.8	Both	1999
1	1	3	1305	88.9	90.3	1.4	Both	1999
Region	**District**	**Highway**	**LKI Segment**	**Start km**	**End km**	**Length (km)**	**Side of Highway**	**Installation Date**
1	2	19	2313	8.367	10.555	2.188	Right	1997
1	2	19	2314	5.237	7.443	2.206	Right	1997
1	2	19	2314	8.128	10.283	2.155	Right	1997
1	2	19	2314	11.234	13.419	2.185	Right	1997
1	2	19	2347	2.03	7.17	5.14	Right	9/24/99
1	2	19	2348	9.48	14.729	5.249	Right	9/24/99
1	2	19N	2365	0	6.6	6.6	Right	1998
1	2	19S	2366	2.4	8.9	6.5	Right	1998
1	2	19N	2373	15.59	24.02	8.43	Right	1998
1	2	19S	2374	19.52	27.86	8.34	Right	1998
Region	**District**	**Highway**	**LKI Segment**	**Start km**	**End km**	**Length (km)**	**Side of Highway**	**Installation Date**
2	3	3	1380	7.24	7.94	0.7	Both	1993
2	3	3	1380	7.95	9.03	1.08	Northbound	1993
2	3	3	1380	23.54	24.73	1.19	Both	1993
2	3	3	1380	38.32	42.62	4.3	Both	1995
2	3	3	1380	58.74	62.25	3.51	Both	1993
2	3	3	1385	2.78	6.41	3.63	Northbound	1989
2	3	3	1385	18.75	21.41	2.66	Northbound	1989
2	3	3	1385	49.73	52.73	3	Both	1993/95
2	3	3	1395	1.47	2.24	0.77	Both	1993
2	3	3	1395	2.54	3.21	0.67	Both	1993
2	3	3	1395	2.98	4.11	1.13	Both	1993
2	3	3	1395	57.26	58.34	1.08	Both	1987
2	3	3	1395	65.03	66.04	1.01	Both	1994
2	3	93	2110	2.17	2.83	0.66	Both	3/31/95
2	3	93	2110	5.02	6.16	1.14	Both	3/31/95
2	3	93	2110	17.14	17.64	0.5	Both	3/31/95
2	3	93/95	2135	26.56	29.55	2.99	Both	1993
2	3	93/95	2140	0.21	0.87	0.66	Both	1983
2	3	93/95	2140	6.27	7.44	1.17	Both	1994
2	3	93/95	2140	51.02	52.28	1.26	Both	1992

Table 4.1 – Wildlife Warning Reflector Locations (April 2004) continued

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
2	3	93/95	2140	52.3	53.01	0.71	Both	1992
2	3	93/95	2140	57.74	58.31	0.57	Both	1993
2	3	93/95	2140	63.01	63.82	0.81	Westbound	1994
2	3	93/95	2140	95.41	97.05	1.64	Westbound	1994
2	3	93/95	2140	97.07	97.39	0.32	Both	1994
2	3	93/95	2140	99.15	99.7	0.55	Both	1994

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
2	4	3	1325	70.5	72.5	2	Both	9/1/95
2	4	3	1325	121.16	123.15	1.99	Both	3/31/95
2	4	3	1325	134.59	143.96	9.37	Both	3/31/95
2	4	3A	1373	59.74	60.13	0.39	Southbound	3/31/95
2	4	3	1375	14.32	14.92	0.6	Southbound	3/31/95
2	4	3	1375	24.26	31.71	7.45	Southbound	3/31/95
2	4	6	1950	9.98	10.35	0.37	Southbound	3/31/95
2	4	22	1340	10.35	11.76	1.41	Both	3/31/95
2	4	33	1327	5	9	4	Both	9/1/95

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date*
2	6	5	1760	50.9	52.3	1.4	Both	1995/96

*reinstalled to new specs Sep-99

2	6	5	1760	52.3	54.8	2.5	Both	Sep-99
2	6	5	2000	81.55	82.15	0.6	Northbound	1986/88
2	6	5	2000	85	85.2	0.2	Northbound	1986/88
2	6	5	2000	85.4	90.13	4.73	Northbound	1986/88
2	6	5	2000	90.26	91.85	1.59	Northbound	1986/88
2	6	5	2000	91.97	92.05	0.08	Northbound	1986/88
2	6	5	2000	92.43	93.11	0.68	Northbound	1986/88
2	6	5	2000	103.08	103.1	0.02	Northbound	1986/88
2	6	5	2000	104.3	104.42	0.12	Northbound	1986/88
2	6	5	2005	4.74	6.51	1.77	Southbound	1986/88
2	6	5	2005	16.81	19.44	2.63	Southbound	1986/88
2	6	5	2005	19.62	24.49	4.87	Southbound	1986/88
2	6	5	2005	27.38	27.68	0.3	Southbound	1986/88

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
2	7	97	1145	28.3	30.3	2	Both	2004
2	7	97	1145	32	35.3	3.3	Both	2003
2	7	97	1145	50.27	54.32	4.15	Both	2004
2	7	97	1145	54.3	62.4	8.1	Both	2003
2	7	97	1145	79.1	84.1	5	Both	2004
2	7	97	1150	18.8	21.6	2.8	Both	11/29/99

Table 4.1 – Wildlife Warning Reflector Locations (April 2004) continued

Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
3	8	49	1197	3.22	4.12	0.9	Both	9/1/96
3	8	97	1160	128.32	128.75	0.43	Both	8/30/99
3	8	97	1170	32.39	33.6	1.21	Both	9/1/96
Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
3	10	16	1520	59.34	62.81	3.47	Both	8/1/98
3	10	16	1520	74.5	76.655	2.155	Both	8/1/95
3	10	16	1520	77.41	77.845	0.435	Both	8/1/94
3	10	16	1520	78.52	79.565	1.045	Right	8/1/95
3	10	16	1520	78.535	78.695	0.16	Left	8/1/95
3	10	16	1520	80.018	81.029	1.011	Both	8/1/95
3	10	16	1520	84.225	85.253	1.028	Both	8/1/95
3	10	16	1520	87.584	92.392	4.808	Left	8/1/95
3	10	16	1520	88.507	92.404	3.897	Right	10/1/96
3	10	16	1520	93.277	94.02	0.743	Both	10/1/96
3	10	16	1520	97.36	97.928	0.568	Both	8/1/95
3	10	16	1520	98.01	98.165	0.155	Right	9/1/96
3	10	16	1520	99.218	100.095	0.877	Both	9/1/96
3	10	16	1520	103.8	104.8	1	Both	12/20/95
3	10	16	1520	108.18	110.5	2.32	Both	11/29/92
3	10	16	1580	103.8	104.8	1	Both	10/1/94
3	10	16	1590	28.39	28.99	1.6	Both	12/1/96
3	10	16	1590	29.49	31.43	1.94	Both	12/1/96
3	10	16	1590	65.28	65.98	0.7	Both	7/16/99
3	10	16	1590	66.12	66.98	0.86	Both	7/16/99
3	10	37	1514	44.9	47.1	2.2	Both	1997
3	10	383	N/A	0.16	1.66	1.5	Both	1995
Region	District	Highway	LKI Segment	Start km	End km	Length (km)	Side of Highway	Installation Date
3	11	95A	2115	12.42	12.83	0.41	Both	1983/95
3	11	95A	2115	13.17	19.79	6.62	Both	1994
3	11	95A	2115	15.72	19.24	3.52	Eastbound	1993
3	11	95A	2115	21.9	24.19	2.29	Both	1992
3	11	95A	2115	24.21	24.35	0.14	Eastbound	1992
3	11	95	2160	2.95	3.32	0.37	Westbound	1992
3	11	95	2160	12.16	13.62	1.46	Both	1993
3	11	95	2160	13.65	14.1	0.45	Both	1993
3	11	95	2160	14.19	14.82	0.63	Westbound	1994

The success of wildlife warning reflectors for reducing wildlife accidents continues to be the object of discussion and speculation. Research by BCMoT and other transportation agencies continues to provide inconsistent evaluations of the devices.

Based upon the WARS data collected, it is apparent not all wildlife reflector installations have been successful. Most installations are less than 2 kilometres long, with 17% being

0.5 kilometres or less in length. Short installations make evaluation difficult because it is easier for animals to travel to the ends of the reflector installations and cross the highway. Given the relatively short distances of the majority of the reflector installations, the relatively low number of wildlife accidents recorded before and after the reflectors were installed, and the lack of measurable controls, determining if the reflectors produce statistically significant reductions in the numbers of deer-related motor vehicle accidents is very difficult.

The "before and after" method typically used to evaluate reflectors does not give a true picture of effectiveness because there is no control of those factors which can change during the course of the evaluation period, such as weather, traffic flow, and deer population densities (Damas and Smith, 1983). However, even if accidents are reduced following the implementation of a safety project, it does not necessarily follow that the decrease was caused by the project (Griffin, 1997).

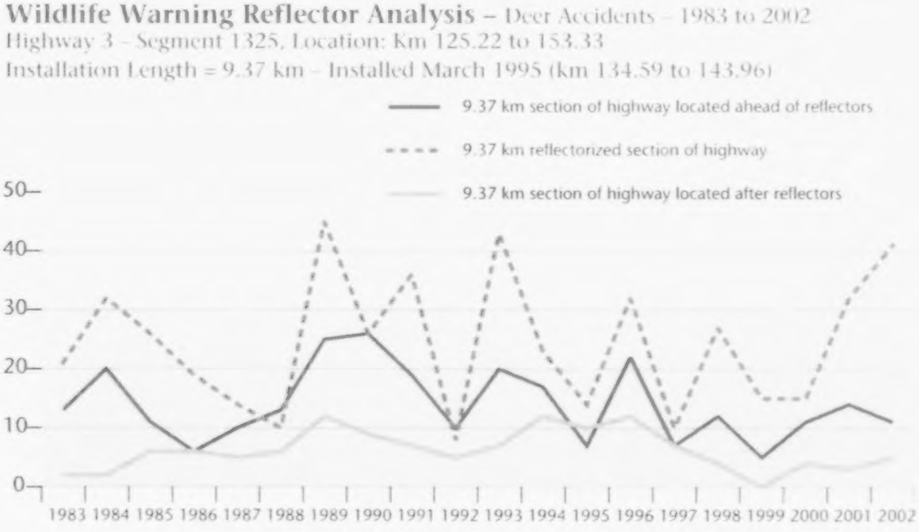
Wildlife Warning Reflector Installation Case Studies

Highway 3, located near the Canada/US border in British Columbia, north of the U.S. states of Washington, Idaho, and Montana, has one of the worst records for ungulate related motor vehicle accidents in British Columbia. In an attempt to reduce the number of deer related motor vehicle accidents, BCMoT installed wildlife warning reflectors on a 9.37 km section of Highway 3 (LKI Segment 1325), east of Grand Forks, and on a 7.45 km section of Highway 3 (LKI Segment 1375), east of Creston. The installations were completed in March 1995. These are the longest continuous reflector installations in British Columbia.

a) Highway 3 (Segment 1325)

When comparing the deer accident rates before and after the reflector installation, it appears the number of deer accidents recorded increased after the installation (Figure 4.4). When comparing the deer accident rate for the 9.37 km reflectorized section of the highway with the deer accident rate for an immediately adjacent 9.37 km non-reflectorized section of the highway, it appears the installation of reflectors did not alter the overall local accident trends.

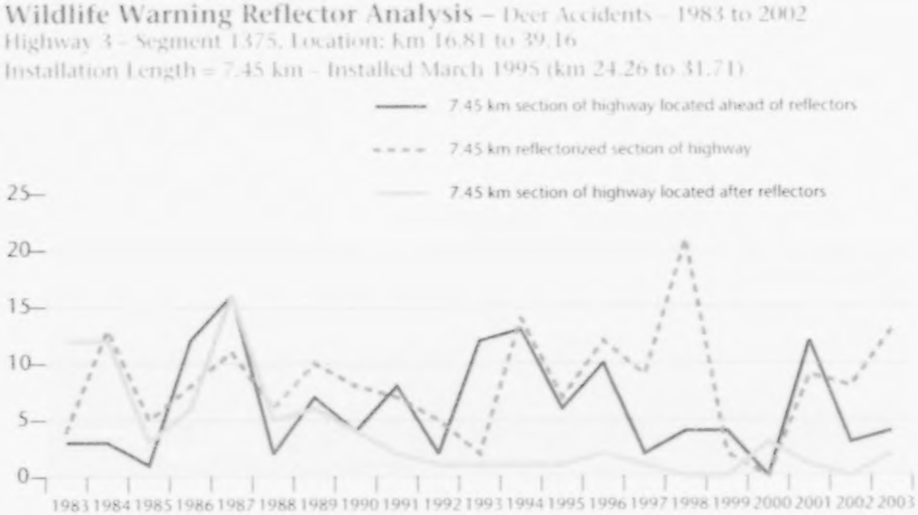
Figure 4.4 Wildlife Warning Reflector Installation Analysis (Hwy 3, Segment 1325)



b) Highway 3 (Segment 1375)

When comparing the deer accident rates before and after the reflector installation, it appears the number of deer accidents recorded increased after the installation (Figure 4.5). When comparing the deer accident rate for the 7.45 km reflectorized section of the highway with the deer accident rate for immediately adjacent 7.45 km non-reflectorized sections of the highway, it appears the installation of reflectors did not alter the overall local accident trends.

Figure 4.5 Wildlife Warning Reflector Installation Analysis (Hwy 3, Segment 1375)



Further Study

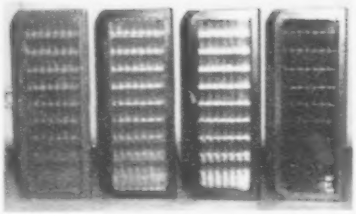
Although these trends were not observed as part of a controlled scientific experiment, they raise questions about the effectiveness of wildlife warning reflectors. When comparing the deer accident rates before and after a reflector installation, there appears, at least in these two cases, to be no consistent accident rate drop after the reflector installation that can be specifically attributed to the reflectors.

A more thorough analysis of WARS data is required to determine the long-term effectiveness of wildlife warning reflectors on provincial highways. There may be many reasons why dramatic fluctuations in the number of accidents occur, including climate, traffic speed and volume, time of day, and wildlife movement.

In 1999, ICBC provided BCMoT with $19,000 to initiate a controlled study to determine the effectiveness of wildlife warning reflectors on a 3.4 km stretch of Highway 5 between Clearwater and Vavenby, in central British Columbia. It is anticipated data will be collected for at least 4 to 5 years before any conclusive results can be expected.

Spectrometric Evaluation of Wildlife Warning Reflectors

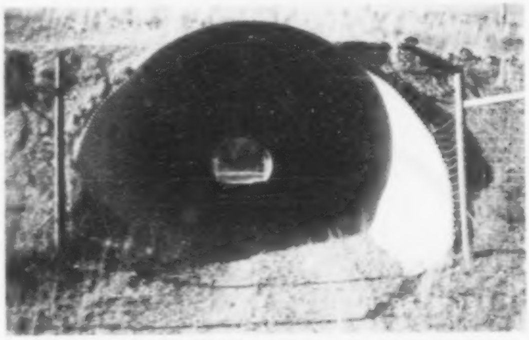
In addition to field tests, BCMoT began examining how wildlife warning reflectors may influence the roadside behavior of deer. As a first step toward understanding how wildlife warning reflectors operate, BCMoT conducted tests on different coloured


Reflectors

(Photo: Leonard Sielecki)

Swarflex and Strieter-Lite reflectors to determine their fundamental spectrometric and photometric properties (Sivic and Sielecki, 2001). The tests were designed to measure the reflected light spectrum, luminous intensity and light distribution in a horizontal and vertical plane. BCMoT has traditionally used red coloured Swarflex and Strieter-Lite reflectors. Questions have been raised regarding the effectiveness of red coloured reflectors for deer (Zacks, 1986). In light of deer vision research (Jacob et al., 1994), BCMoT is investigating if other colours (green, amber and white) of reflectors may be more effective than red ones. Installation of white reflectors has begun on selected sections of Highway 19 as part of the Vancouver Island Highway Project.

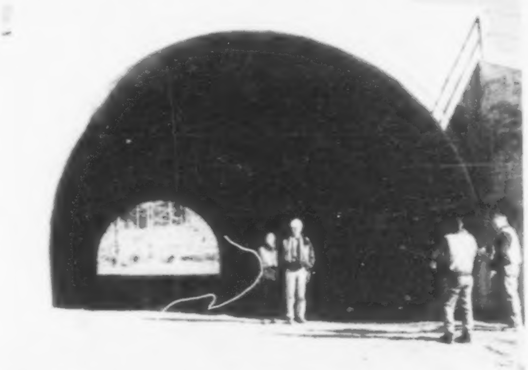
Trepanier Overpass, 1987 (Photo: Bill Harper)



Wildlife Underpass, 1987 (Photo: Bill Harper)

4.5 Wildlife Passage Structures

Grade-separated wildlife passage structures have special importance with regards to the Ministry's efforts to minimize habitat fragmentation. Whether they are used independently, or incorporated with wildlife exclusion fencing and wildlife exclusion systems, they represent the safest method of allowing wildlife to traverse a highway corridor.



Wildlife Underpass, 1999 (Photo: Leonard Sielecki)

VIHP Underpass, 1999 (Photo: Leonard Sielecki)

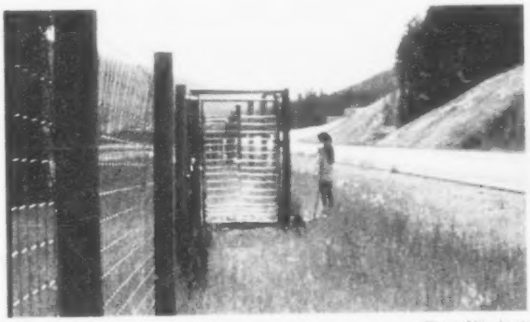
In 1987, BCMoT constructed the first wildlife overpass in Canada and the second in North America. The Trepanier Overpass on the Okanagan Connector built upon the concept of the first overpass built in Utah. At a cost of approximately $1 million, the Trepanier Overpass was developed from the design of a pedestrian highway overpass. Structural advancements were required to accommodate the weight of soil and vegetation necessary to create a "natural" environment to encourage wildlife use. Detailed wildlife studies conducted for the Okanagan Connector supported the decision to construct the overpass. The overpass provided an essential passage for critical summer and winter deer habitat.

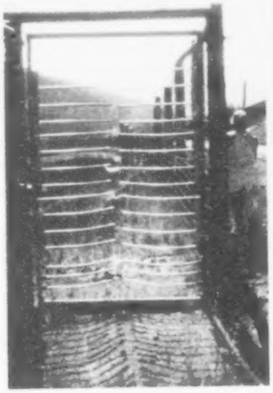
There are over 30 crossing structures located in British Columbia used for wildlife passage. All, but one, are underpasses. They were installed on the Coquihalla Highway (Highway 5), the Okanagan Connector, Highway 97 and the Vancouver Island Highway. The Ministry has found that wildlife overpasses can be difficult to locate given terrain and geologic constraints. If designed properly, underpasses can be multi-purpose, suiting both wildlife and highway infrastructure needs. The size and design of the structures has been evolving as the understanding of how wildlife interact at the highway/wildlife habitat interface grows. Underpasses are now larger and more species-friendly, with carefully selected flooring materials to suit the target species.

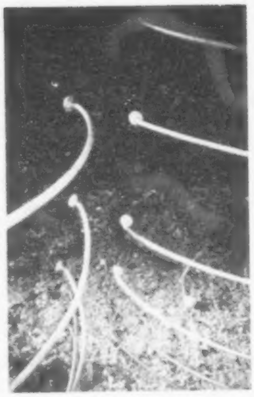
In a continued effort to maximize the use of environmental enhancement funds and improve the effectiveness of passage structures, the Ministry is focusing its attention to underpasses for multi-species use. Large multi-plate culverts can cost upwards of $500,000 while concrete bridges and box culverts can cost several million dollars. Stream crossing structures can also function as wildlife underpasses, if consideration is given to ensuring that the design criteria includes provision for wildlife movement. This can be accomplished through the incorporation adequately sized passage envelopes and suitable trail surfacing over riprapped areas.

4.6 Wildlife Exclusion Fences

Since the mid 1980s, the Ministry has been proactively locating wildlife exclusion fencing on high speed, high volume highways transecting identified wildlife habitat. (Table 4.2)


One-way gate approach (Photo: Mike Kent)


One-way gate (Photo: Mike Kent)


Gate tynes (Photo: Leonard Sielecki)

The greatest investment in wildlife accident mitigation by BCMoT has been its wildlife exclusion systems, incorporating specialized fencing designs and crossing structures. Since the mid 1980s the Ministry has been one of the leaders in designing and developing wildlife exclusion systems. MoT's wildlife exclusion systems on the Coquihalla and the Okanagan Connector were pioneering efforts for their time.

The recently completed Vancouver Island Highway wildlife exclusion installations are state of the art initiatives. With each successive project, the Ministry has refined its designs and standards, to improve the efficiency and effectiveness of its wildlife exclusion systems. Both fence and crossing structure designs have evolved over time.

Table 4.2 Locations of Wildlife Exclusion Fencing

Total Fencing Length on British Columbia Highways = 467.44 km

(This figure includes fencing located on both sides of highways)

Location: Coquihalla Highway (No. 5)	Distance (km)	Completion Date
Dry Gulch – Henning Bridge	5.99	July 1994
Henning Bridge – Juliet Creek	9.23	May 1993
Juliet Creek Bridge – Brodie Bridge	9.35	Oct 1993
Brodie Bridge – Kingsvale Bridge	8.72	March 1997
Upper Clapperton Creek – Desmond Lake	8.3	April 1990
Desmond Lake – Meadow Creek Road	8.6	July 1988
Meadow Creek Road – Chuwhels Mountain Road	8.2	Sept 1987
Chuwhels Mountain Overpass – Connolly Lake Overpass	5.2	June 1993
Connolly Lake Overpass – Inks Lake Interchange	7.6	May 1994
Total Fencing (includes both sides of highway)	**140.44 km**	

Location: Okanagan Connector Freeway (No. 97C)	Distance (km)	Completion Date
Aspen Grove to Drought Hill Interchange	82	Fall 1990
Total Fencing (includes both sides of highway)	**164 km**	

Location: Highway 97*	Distance (km)	Completion Date
Bentley Road to Deep Creek	15	March 1999
Total Fencing (one side of highway)	**15 km**	

Location: Inland Island Highway (No. 19)	Distance (km)	Completion Date
Mud Bay to Trent River (one side of highway)	20	March 1999
Millar Creek to Oyster River (both sides of highway)	23	April 2001
Maple Lake Pit to Headquarters Creek (both sides of highway)	26	August 2001
Oyster River to Willow Creek (both sides of highway)	15	May 2001
Total Fencing (includes both sides of highway)	**148 km**	

* *Fencing materials provided by BCMoT; ICBC contributed $128,000, construction labour and on-going maintenance provided by members of the Summerland Sportsmens' Association and the Peachland Sportmens' Association, affiliated associations of the British Columbia Wildlife Federation.*

The Ministry has the most extensive network of wildlife exclusion fencing in North America. To date approximately 470 km of fencing has been installed on the Coquihalla Highway (Highway 5), the Okanagan Connector Freeway, Highway 97 and the Vancouver Island Highway Project.

In most cases, fencing is installed as a part of new highway construction or on existing highways where problematic wildlife accident locations have been identified.

WILDLIFE
FENCE

Wildlife fence on Highway 97

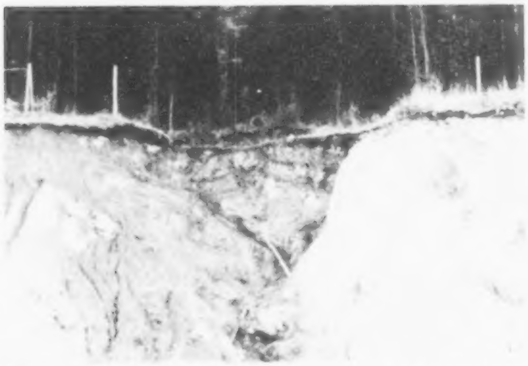
(Photo: Leonard Sielecki)

Fencing can be installed as a primary deterrent or integrated with crossing structures such as overpasses, underpasses and one way gates. This type of mitigation is expensive. It can cost between $40,000 to $80,000 per km to fence both sides of a highway. Construction costs vary greatly due to differences in terrain and locations.

Exclusion fencing is the most effective means of keeping wildlife off highway right-of-ways. The Ministry's experience with 2.4 m high fencing on both sides of right-of-ways show it is 97–99% effective in preventing wildlife-vehicle accidents.

Wildlife exclusion fencing has proven very effective in reducing wildlife accidents on the Coquihalla Freeway (Highway 5) located between Hope and Merritt. On the 35 km portion of the Coquihalla Freeway, between Dry Gulch Bridge and Kingsvale Bridge, wildlife exclusion fencing eliminated wildlife accidents (from 74, in the 1989 to 1993 period, to 0, in the 1994 to 1998 period).

Since the wildlife exclusion fencing was installed on the Coquihalla Connector Freeway (Highway 97C) in 1990 to 1998, no wildlife accidents have been recorded in either the westbound or eastbound lanes of the highway where the fence is located.



Slumping ground

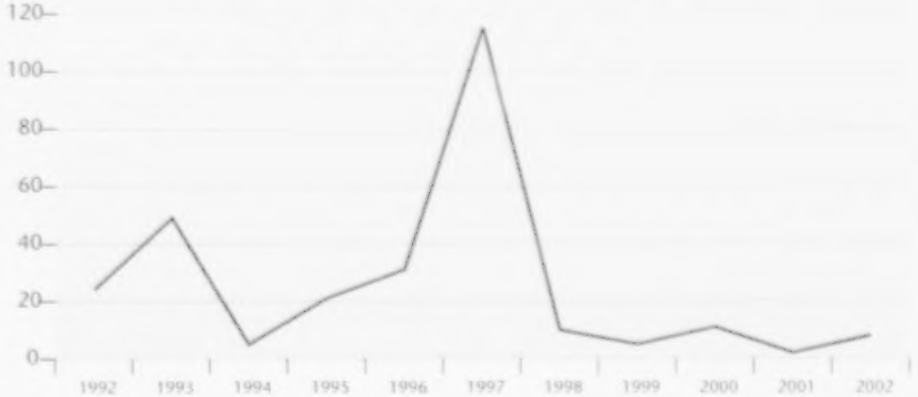
(Photo: Leonard Sielecki)

On Highway 97, between Peachland and Summerland, after a 21 kilometre wildlife exclusion fence was constructed on the west side of the highway, the rate of wild animal accidents/km/year dropped by over 93%. From 1979 to 1998 the annual accident rate was 1.93 accidents/km/year. In 1999, after the fence was completed, the accident rate dropped to 0.13 accidents/km/year. (Figure 4.6)

Fallen tree

(Photo: Leonard Sielecki)

Figure 4.6 – Recorded Deer Accidents (1992 to 2002)
Effectiveness of Wildlife Fence (Highway 97 Peachland to Summerland)



The Mud Bay to Trent River section of wildlife exclusion fencing on the Inland Island Highway was constructed on the west side of the highway alignment. The single-sided fencing configuration was in accordance with the Vancouver Island Highway Project's wildlife consultants recommendation for dealing with Roosevelt Elk resident in the area.

Wildlife exclusion fencing has just been constructed between Oyster River and Willow Creek and between Millar Creek and Oyster River on both sides of the Inland Island Highway. Additional fencing is currently under construction on both sides of the Inland Island Highway between Maple Lake Pit and Headquarters Creek.

Exclusion fencing has been found to be the most effective means of keeping wildlife off highway rights-of-way when installed in conjunction with wildlife crossing structures. Underpasses increase the success of exclusion fencing by increasing the permeability and habitat connectivity across highways (Clevenger and Waltho, 2000). The Ministry's experience with 2.4 m high fencing on both sides of rights-of-way shows it is 97-99% effective in preventing wildlife-vehicle accidents. These results are appear higher than the 80% reductions in wildlife accidents experienced when wildlife exclusion fencing was installed along the Trans-Canada Highway in Banff National Park (Clevenger, Chruszez and Gunson, 2001).

BCMoT has also found wildlife exclusion fencing appears to be effective when installed on only one

Amphibian fencing

(Photo: Leonard Sielecki)

Amphibian fencing connecting to underpass

(Photo: Leonard Sielecki)

side of a highway, if the unfenced side of the highway has pre-existing barriers to animal movement, such as a cliff face. On Highway 97, between Bentley Road and Deep Creek Bridge, fencing was installed on the west side of the highway right-of-way. On the east side of the highway right-of-way there is a steep cliff dropping down to Okanagan Lake. It is anticipated that the wildlife exclusion fence on the west side of the highway right-of-way will prevent a repeat of earlier recorded accident peaks (see Figure 4.3).

Vancouver Island Highway Project wildlife fencing

(Photo: Leonard Sielecki)

As part of its growing commitment to increase protection for other species of wildlife, BCMoT is currently installing amphibian exclusion fencing being attached to the wildlife exclusion fencing located adjacent to Millar Creek on the Inland Island Highway. The fence extends for 1.8 km on both sides of the highway from the north side of Millar Creek to Keddy Swamp tributary No. 3 for a combined length of 3.6 km.

It should be noted, regular maintenance and monitoring are key factors to ensuring wildlife exclusion fencing remain effective. During fence audits, BCMoT has found that the integrity of fencing can be compromised by poor fence designs, faulty construction and materials, extreme snow accumulation and tree falls, as well as poachers and ATV riders seeking passage through the fence

4.7 Integrated Wildlife Management

It is becoming evident that approaching the issue of wild accident mitigation from a single species perspective does not provide the maximum benefit for motorists or wildlife. In British Columbia, integrated wildlife accident management is becoming a greater component of new construction and rehabilitation projects. While, for over 20 years, BCMoT projects have focused on the accident issues associated with larger ungulates, primarily deer, elk and moose, new projects are increasingly becoming more responsive to the needs of smaller mammals and amphibians.

Wildlife exclusion systems are being designed and integrated with larger scale structures and alignment drainage schemes to provide protect an increasing number of animal species. The construction of larger underpasses, such as bridges and culverts, and the retention of natural watercourses, vegetation and landforms under these structures, increases their effectiveness for wildlife and fish passage. High quality wildlife habitat ponds are developed along highway alignments to lessen the impact of highways on wildlife habitat.

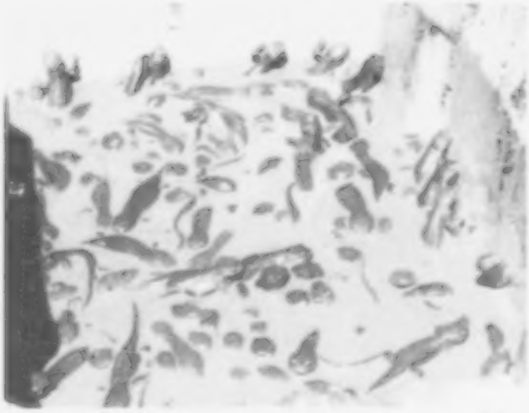
Vancouver Island Highway Project Habitat Pond

(Photo: [illegible])

Most recently, on the Vancouver Island Highway Project, wildlife crossing structures and wildlife habitat ponds were carefully integrated with natural topography and drainage systems, to reduce the potential for wildlife-related motor vehicle accidents and limit the wildlife habitat fragmenting effects of highways.

4.8 Transfers and Relocations

While the Ministry strives to minimize and mitigate the impact of highway development on wildlife, it is not always possible to do so. At times, unforeseen situations develop. As a consequence, in order to ensure a species is protected, the Ministry has conducted a number of limited transfers and relocations. These were done, either to deal with a temporary situation due to construction, or for permanent species protection.



Newt Salvage

(Photo: [illegible])

The Ministry's more current and successful transfers and relocations were associated with the Vancouver Island Highway Project. Although extensive wildlife studies were conducted before and during the construction phase of the highway and wildlife habitat protection and accident mitigation infrastructure was established as an integral part of the project for predicted numbers and species of wildlife, unexpected situations developed. Shortly before the highway was scheduled to open, the Ministry environmental staff identified large numbers of previously undiscovered salamanders becoming active after long-term hibernation in right-of way mud, and Roosevelt elk migrating into the area after highway construction activities ended.

While passage structures were designed and constructed for the salamanders, the Ministry had these amphibians transferred in buckets by hand across the highway. The transfers continued until amphibian fencing was in place and the salamanders were safely guided to strategically placed underpasses.

Repellent Boxes

(Photo: [illegible])

While the Ministry strives to minimize the impact of highway development on wildlife, unforeseen factors can make it impossible to do so in all cases. Although extensive pre-development wildlife studies were conducted and wildlife vehicle accident mitigation was established as integral part of the Vancouver Island Highway Project for predicted numbers and species of wildlife, unexpected numbers of Roosevelt elk began appearing after the highway opened in September, 1999.

Initially, the Ministry kept the elk off the highway with repellents and scare tactics. However, after a unexpected number elk were killed in motor vehicle accidents within the first year of the highway operating, the Ministry focused its efforts on more direct methods of mitigation. In order to reduce potential hazards, the Ministry, in consultation with the B.C. Ministry of Water, Land and Air Protection (MWLAP), decided to relocate as many of the animals from problematic locations along the highway as possible. Relocation of wildlife is not a common approach for the Ministry to deal with potential wildlife hazards. However, this approach was taken because of the size of the animals involved and the posted speed limit of the highway. The relocation was organized and conducted by MWLAP biologists for the Ministry. In November and December, 2000, a total of nine elk from the estimated herd of 50 animals were captured. These animals were then relocated to the west coast of Vancouver Island, approximately 100 km away. (Map 4.1)

Elk Relocation

Corral (Photo: Kim Brunt)

Capture (Photo: Kim Brunt)

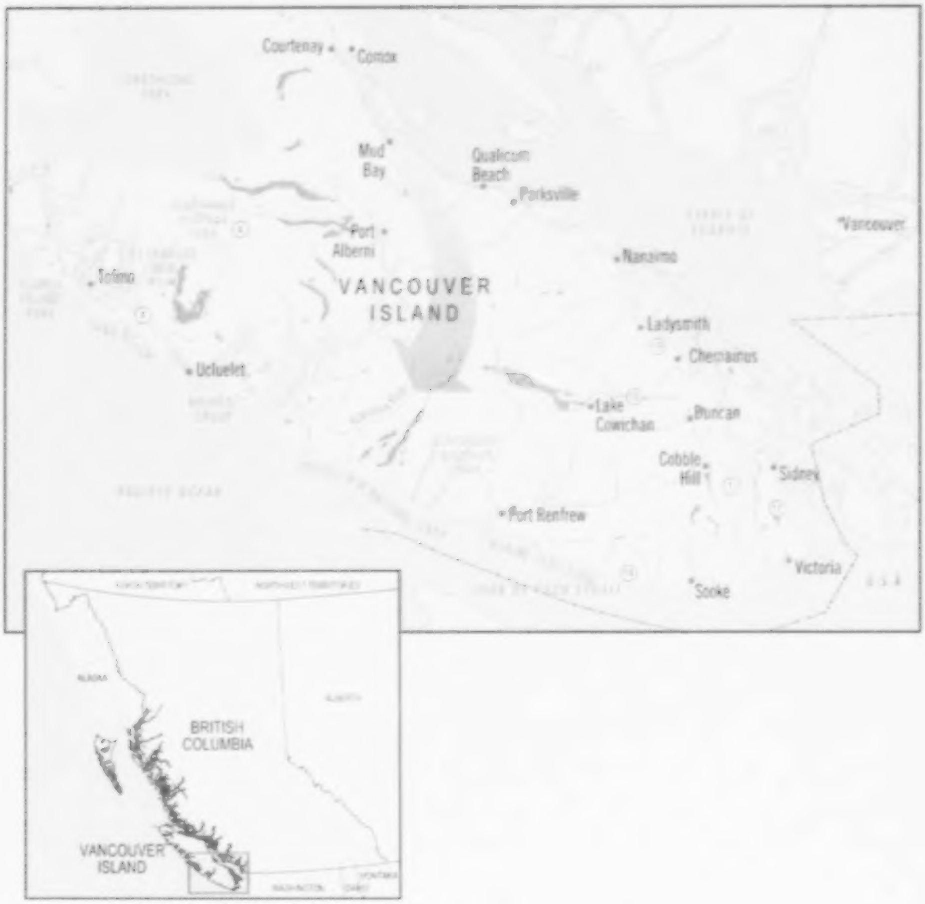
Transport (Photo: Kim Brunt)

Release (Photo: Kim Brunt)

Map 4.1.1B. Relocation – Waterloo Creek to Klanawa River

Courtenay
Comox
Mud Bay
Qualicum Beach
Parksville
Vancouver
Port Alberni
Nanaimo
Tofino
VANCOUVER ISLAND
Ladysmith
Ucluelet
Chemainus
Lake Cowichan
Duncan
Cobble Hill
Sidney
Port Renfrew
Victoria
Sooke
BRITISH COLUMBIA
VANCOUVER ISLAND

Map 4.1 Elk Relocation – Waterloo Creek to Klanawa River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Duncan
Cobble Hill
Sidney
Port Renfrew
Victoria
Sooke
BRITISH COLUMBIA
VANCOUVER ISLAND

5.0 PROVINCIAL ACCIDENT STATISTICS

5.1 Overview

In 2002, BCMoT Maintenance Contractors reported 5,031 wildlife-vehicle accidents. This is a decrease of 1.8 % from 2001 (Table 5.1). The increase can be attributed to a variety of factors including seasonal climatic variations, increasing animal populations, and changes in migratory patterns.

With the decrease in 2002, it appears the accident rate has begun to cycle down. The highest number of accidents in the last decade occurred in 1994. A second peak occurred in 2001. These peaks may be attributed to correlated longer term climatic patterns, seasonal animal behavior, or fluctuating traffic volumes. However, since 1983, 59% to 85% of all accidents reported annually have involved deer, so the cycle of deer accidents represents the single largest factor in the cycle of total wildlife accidents in British Columbia (Table 5.2).

The following total accidents and accidents/km/year maps for the time periods, 1983 to 1992 and 1993 to 2002, show the distribution of wildlife accidents by species most commonly found on Provincial highways. The species, which include primarily large ungulates and carnivores, are:

1. Bear,
2. Caribou,
3. Cougar,
4. Coyote,
5. Deer,
6. Elk,
7. Moose,
8. Porcupine,
9. Sheep, and
10. Wolf

These maps enable the Ministry to identify changing patterns in wildlife accidents. It should be noted that due to increased reporting vigilance by the Ministry's Maintenance Contractors and improvements in the WARS system, the information provided in the 1993 to 2002 maps may provide a more complete picture of the wildlife accident situation in the Province. In addition.

Over the last two decades, the growing provincial population has resulted in a corresponding increase in the number of drivers and vehicles using Provincial highways. British Columbia's population increased from 3.4 million to 4.1 million between 1981 and 2001. (Figure 5.1) This was an increase of 20% in twenty years. The number of licensed motor vehicles operating in the Province increased from 1.98 million to 2.35 million between 1991 and 2001 (Figure 5.2). This was an increase of 18% in the last 10 years. The increase in the number of motor vehicles operating on Provincial highways is believed to play a significant role in the incidence of wildlife accidents.

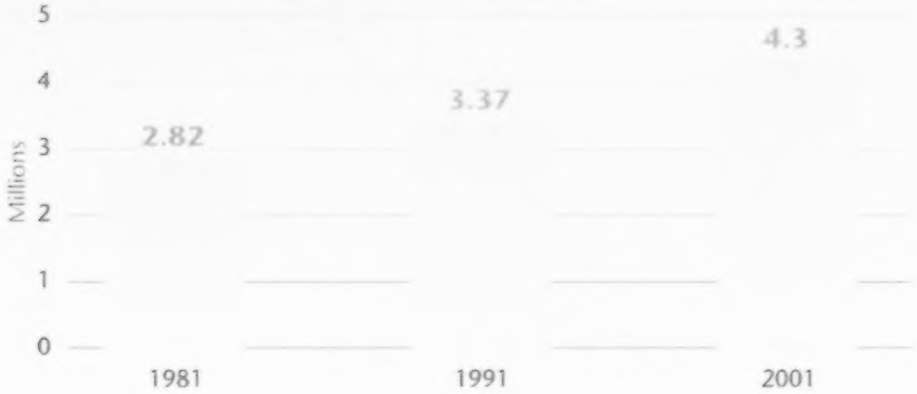
Table 5.1 – Wildlife Accidents (Total and selected major species)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
All Species	1678	1987	2109	2078	2797	2618	3450	3661	3306	3176	4798	5339	4764	3902	3661	4611	4889	4785	5171	5031	**73811**
Bear	27	25	41	67	44	35	61	50	57	73	112	109	108	113	94	142	166	102	135	169	**1430**
Deer	1028	1281	1263	1443	1732	2236	2947	2950	2745	2585	3992	4375	3917	3174	3006	3713	3899	3840	4028	3858	**58012**
Elk	56	74	46	53	72	78	66	74	59	63	75	120	93	104	78	103	129	167	159	179	**1848**
Moose	128	167	141	177	143	152	199	235	183	196	271	405	367	284	255	364	411	323	392	351	**5144**
Other Species	439	440	618	338	806	117	177	352	262	259	348	330	279	227	228	289	284	353	457	474	**7077**

Table 5.2 – Wildlife Accidents (%) (Total and selected major species)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
% All Species	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Bear	1.6	1.3	1.9	3.2	1.6	1.3	1.8	1.4	1.7	2.3	2.3	2.0	2.3	2.9	2.6	3.1	3.4	2.1	2.6	3.4
% Deer	61.3	64.5	59.9	69.4	61.9	85.4	85.4	80.6	83.0	81.4	83.2	81.9	82.2	81.3	82.1	80.5	79.8	80.3	77.9	76.7
% Elk	3.3	3.7	2.2	2.6	2.6	3.0	1.9	2.0	1.8	2.0	1.6	2.2	2.0	2.7	2.1	2.2	2.6	3.5	3.1	3.6
% Moose	7.6	8.4	6.7	8.5	5.1	5.8	5.8	6.4	5.5	6.2	5.6	7.6	7.7	7.3	7.0	7.9	8.4	6.8	7.6	7.0
% Other Species	26.2	22.1	29.3	16.3	28.8	4.5	5.1	9.6	7.9	8.2	7.3	6.2	5.9	5.8	6.2	6.3	5.8	7.4	8.8	9.4

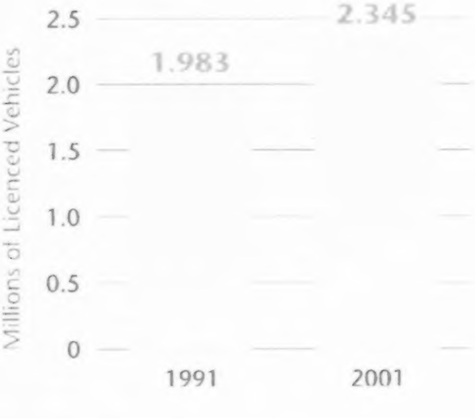
Figure 5.1 BC's Population - Up 22% in a Decade



British Columbia Traffic

(Photo: BC Ministry of Transportation)

Figure 5.2 BC's Traffic - Up 18% in a Decade



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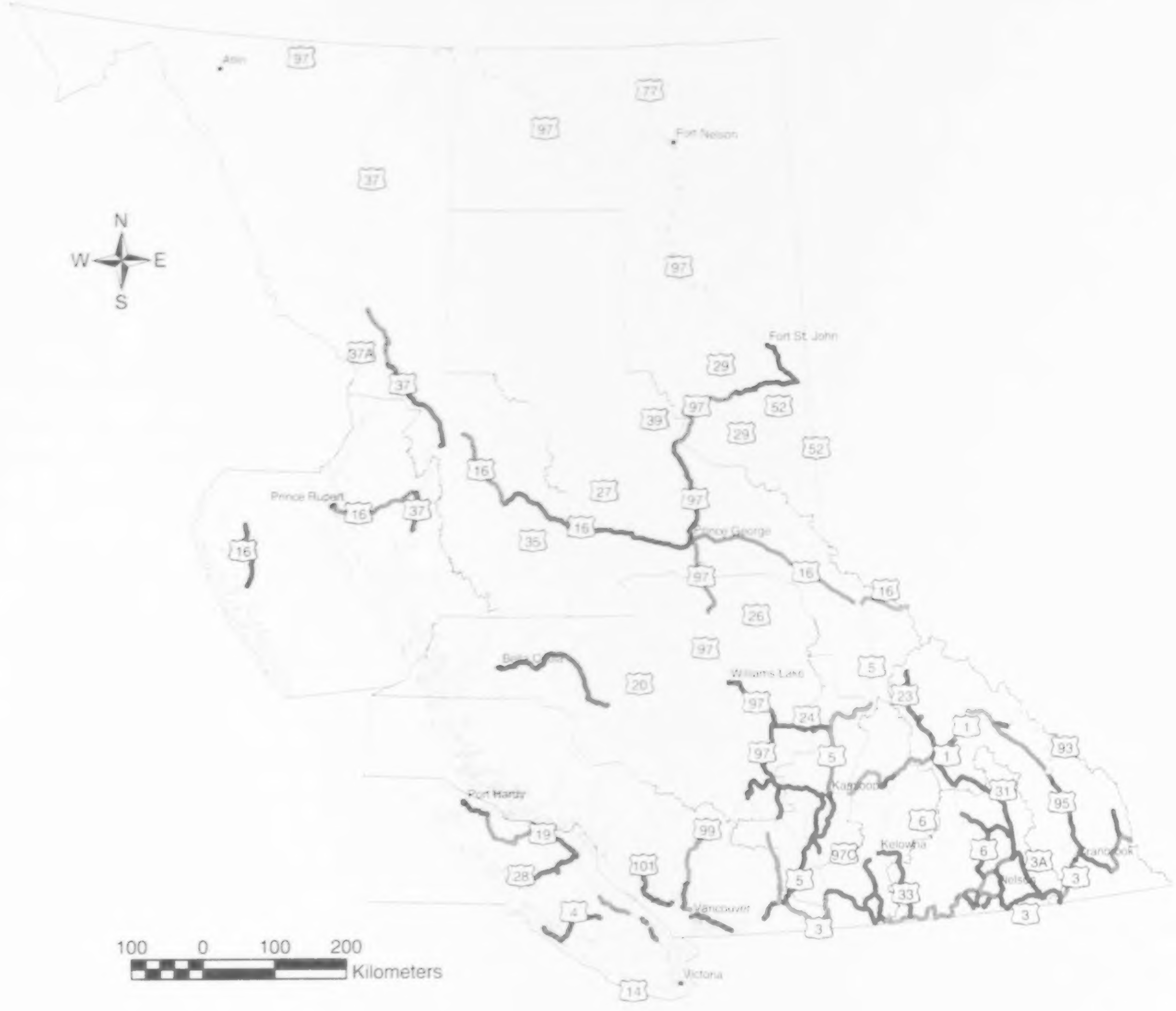
*Adapted from: British Columbia Ministry of Transportation. 2003. *Opening Up BC: A Transportation Plan for British Columbia*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Victoria

Map 5.1

Total Bear Accidents (1983 - 1992)

Legend

━ 1 - 5

━ 6 - 10

━ 11 - 15

━ 16 - 25

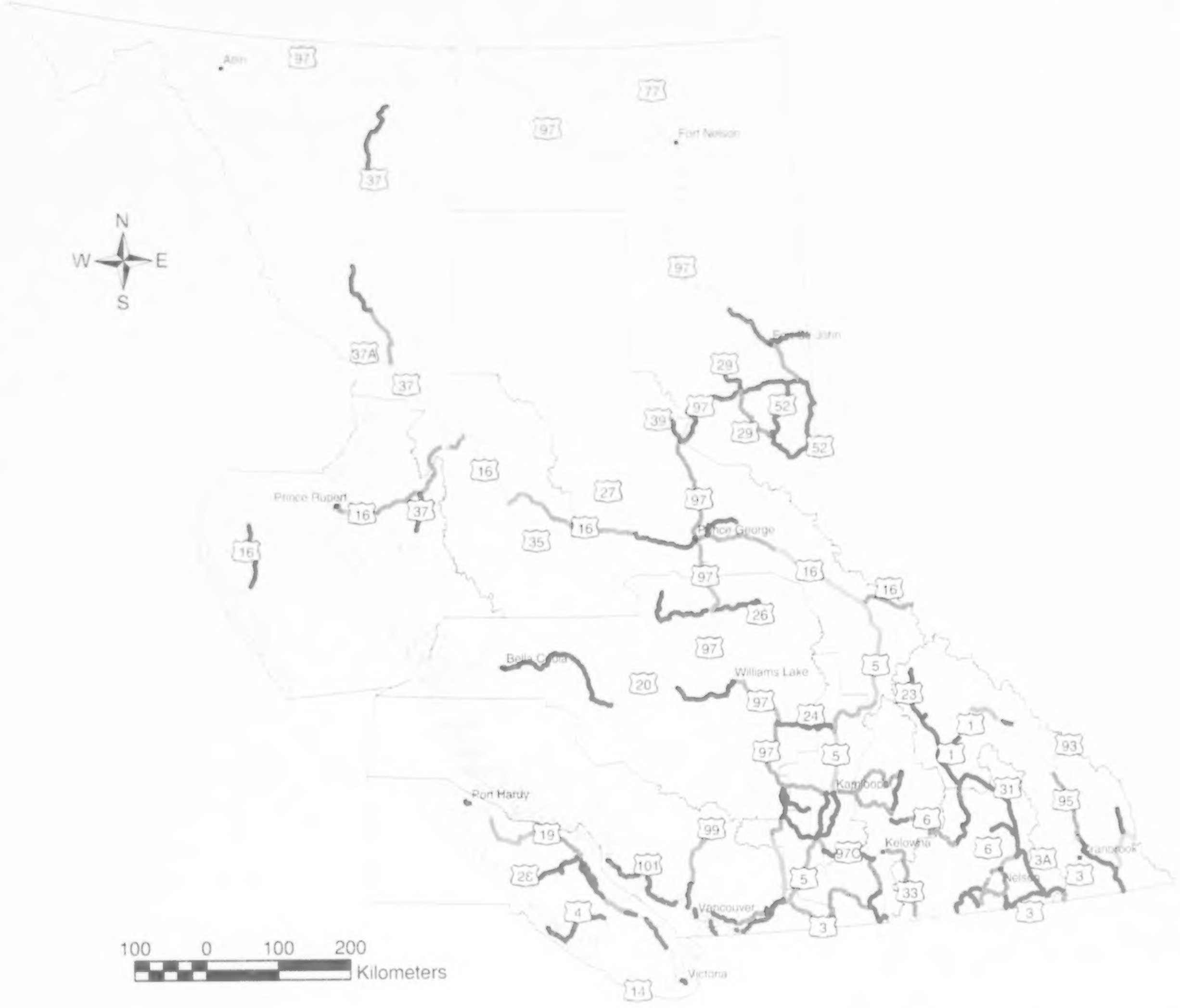
━ 26 - 47

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002. Wildlife Accident Reporting System 2002 Annual Report. British Columbia Ministry of Transportation, February 2004; maps produced by Ministry of Sustainable Resource Management.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Map 5.2

Total Bear Accidents (1993 - 2002)

Legend

▬ 1 - 5

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▬ 11 - 15

▬ 16 - 25

▬ 26 - 47

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
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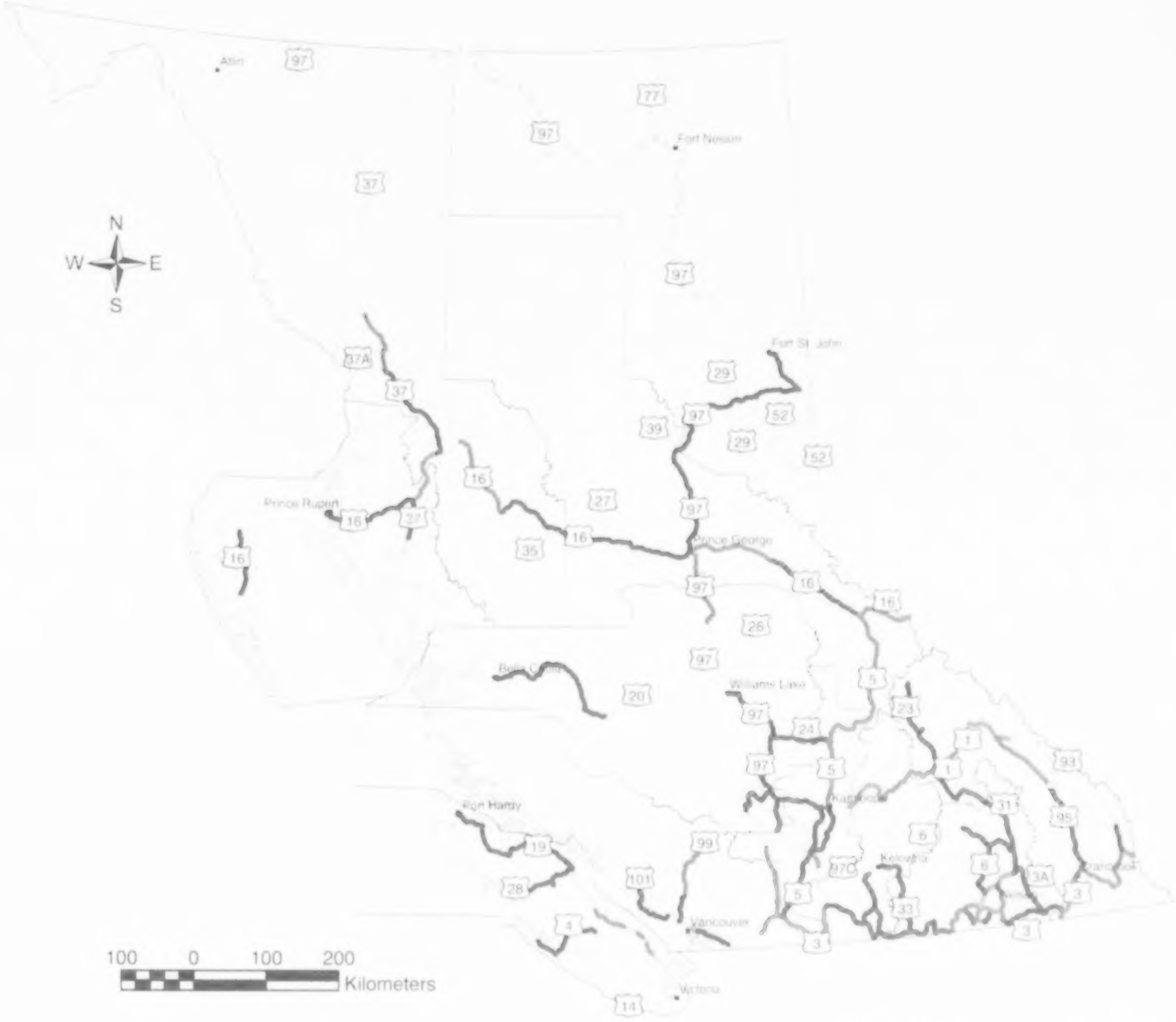
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Map 5.3

Bear Accidents
per Kilometre per Year
(1983 - 1992)

Legend

▬ 0.001 - 0.005

▬ 0.006 - 0.015

▬ 0.016 - 0.030

▬ 0.031 - 0.060

▬ 0.061 - 0.242

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004; maps produced by Ministry
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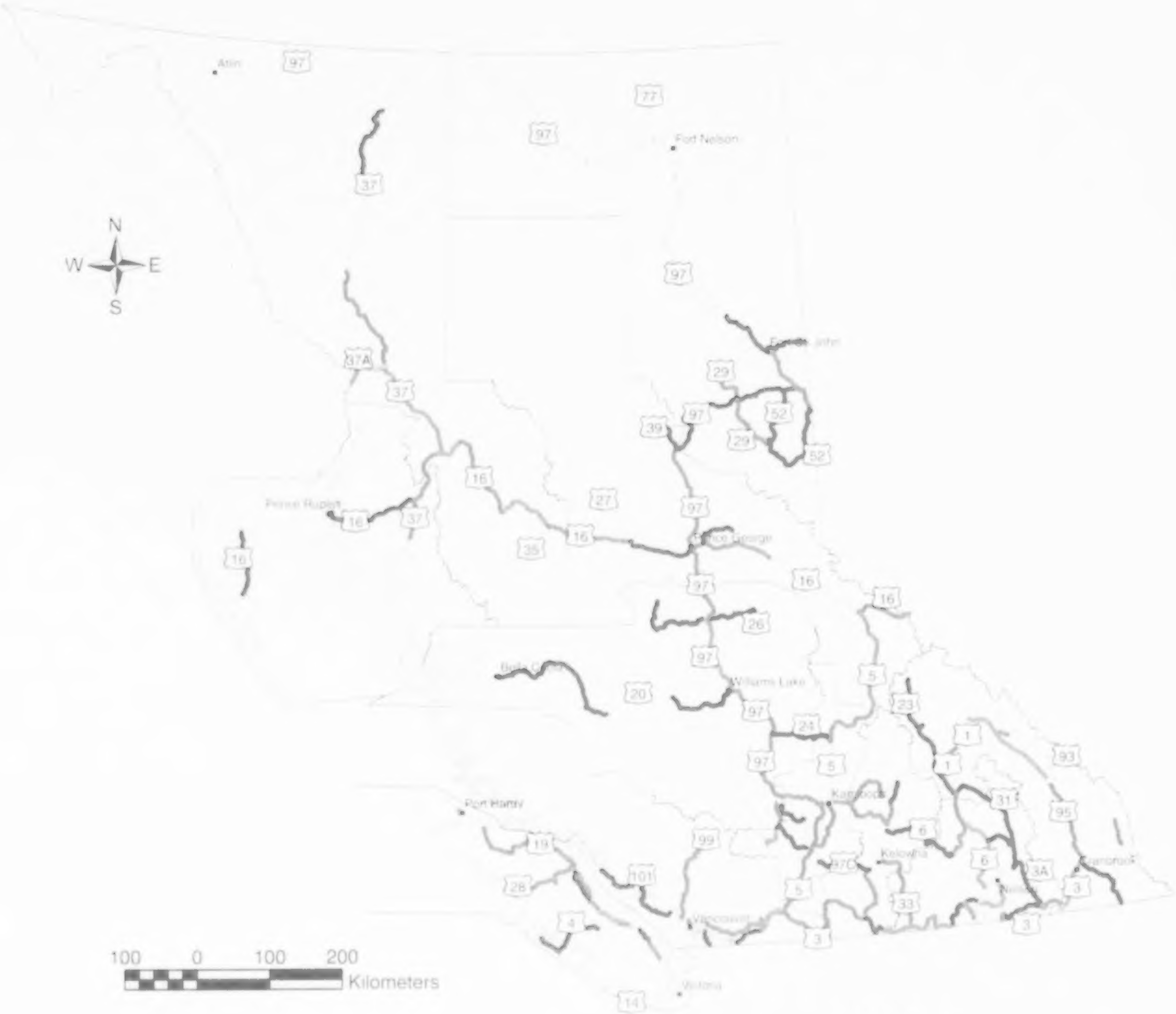
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Kilometers
14
Victoria

Map 5.4

Bear Accidents
per Kilometre per Year
(1993 - 2002)

Legend

▬ 0.001 - 0.005
▬ 0.006 - 0.015
▬ 0.016 - 0.030
▬ 0.031 - 0.060
▬ 0.061 - 0.242
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
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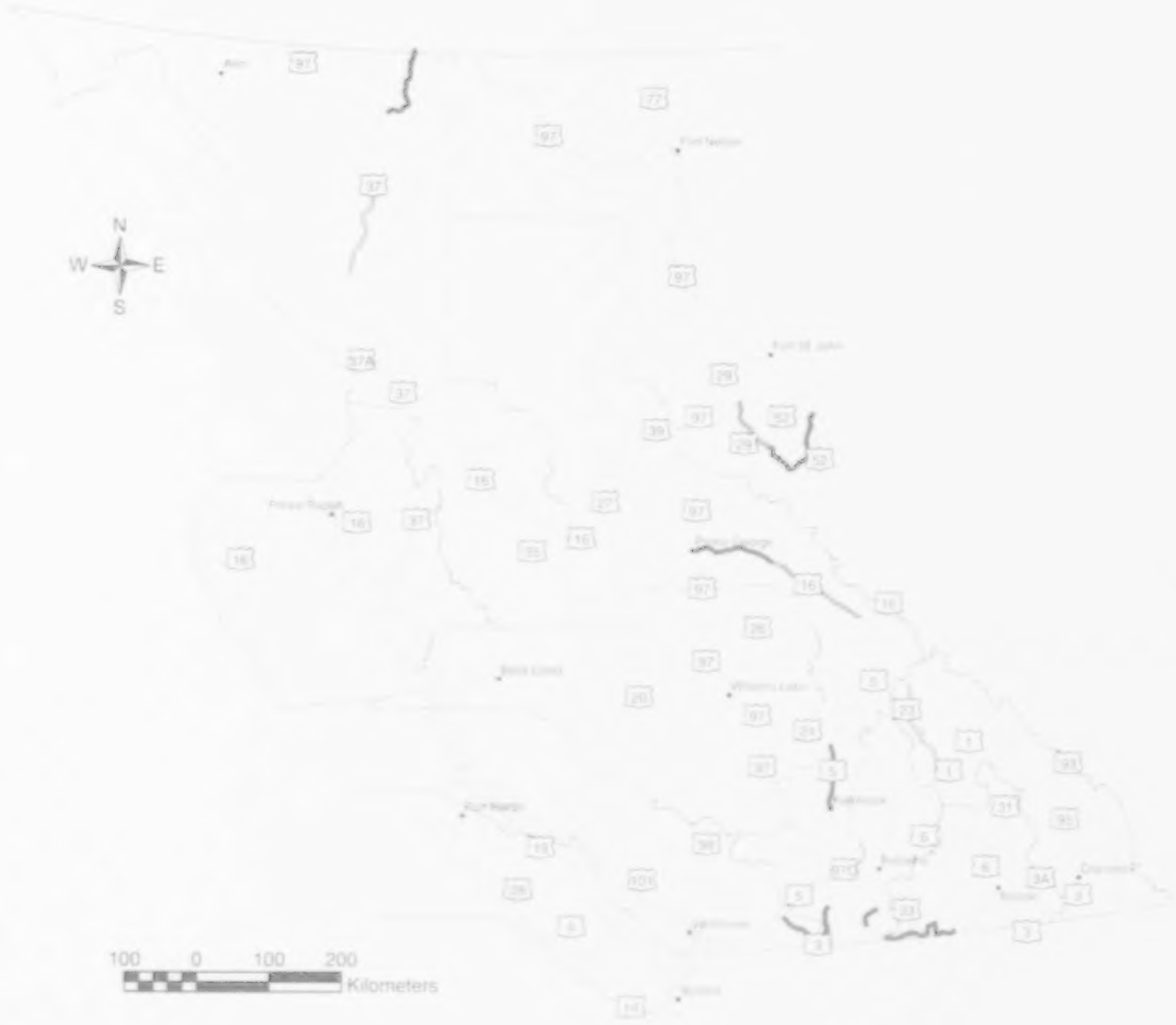

Map 5.5

Total Caribou Accidents (1983 - 1992)

Legend

— 1
— 2
— 3
— 4
— 5
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004, maps produced by Ministry
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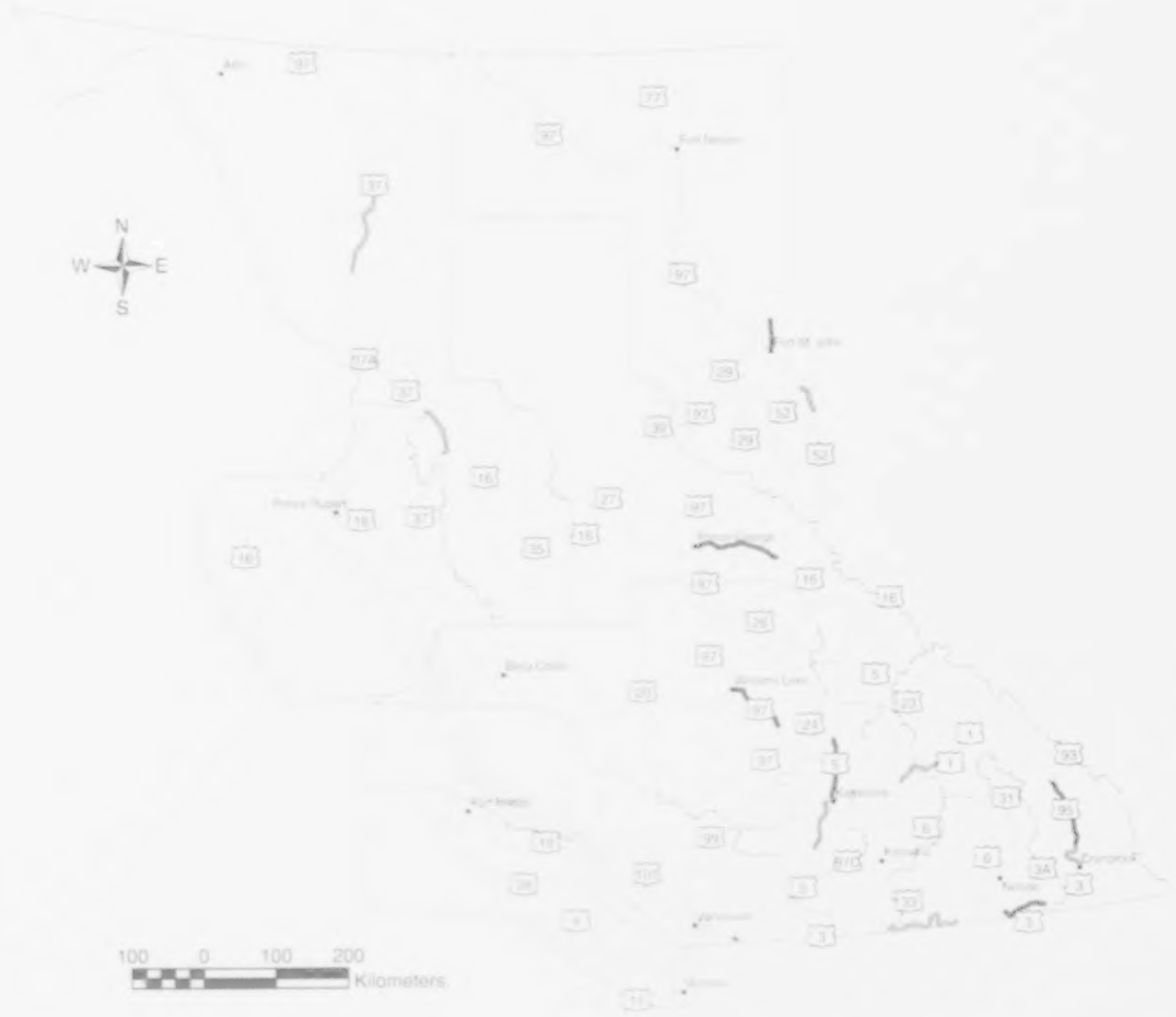
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Bella Coola
Williams Lake
Kamloops
Kelowna
Nelson
Cranbrook
Port Hardy
Vancouver
Victoria
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Kilometers

Map 5.6

Total Caribou Accidents (1993 - 2002)

Legend

- 1
- 2
- 3
- 4
- 5

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

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2002 Annual Report
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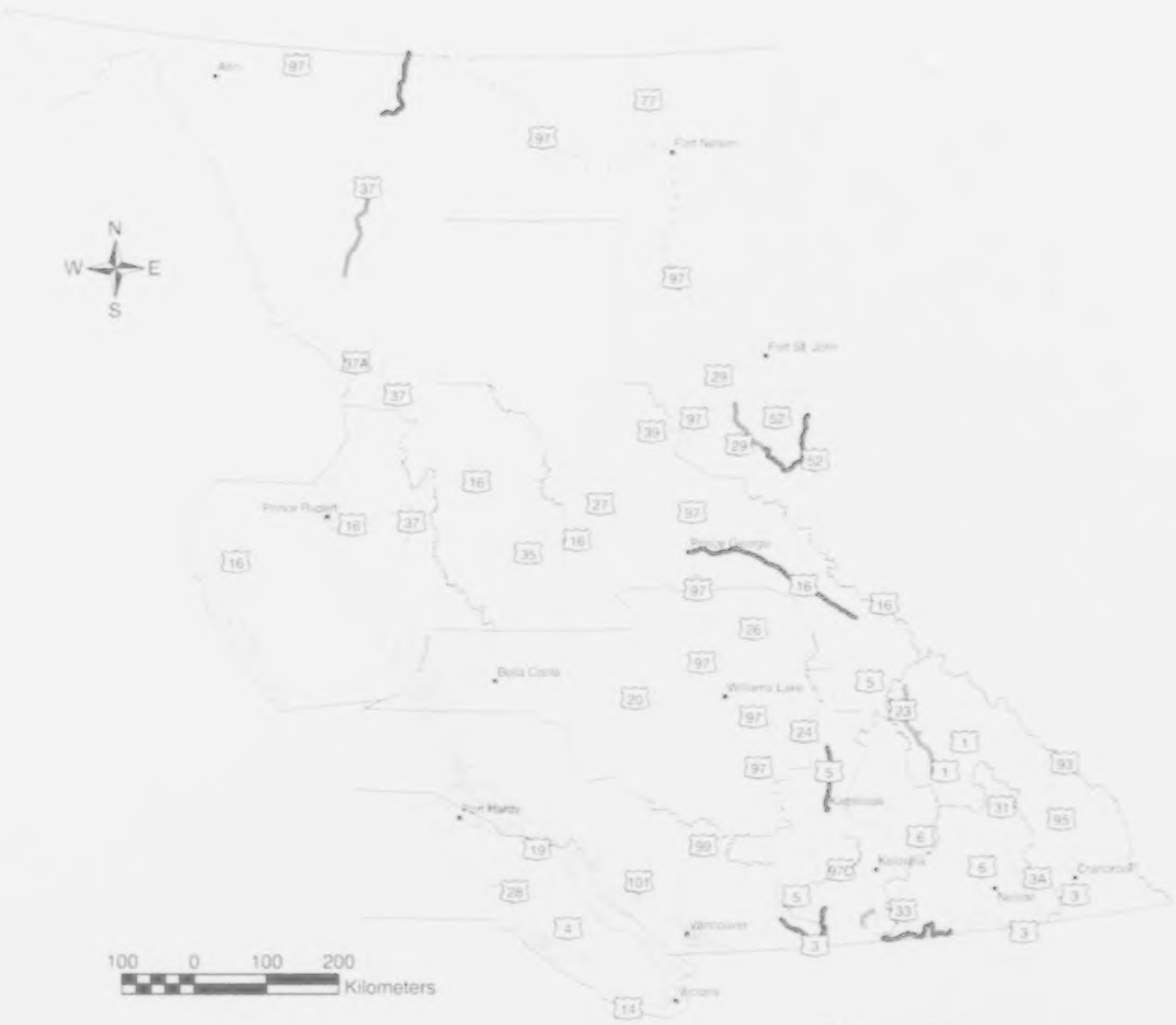

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E
S
97
Fort St. John
37A
29
37
97
52
39
29
52
16
Prince Rupert
27
16
37
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
5
20
Williams Lake
23
97
24
1
97
5
1
93
Kamloops
Port Hardy
31
95
6
99
19
97C
Kelowna
6
Cranbrook
101
28
3A
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Figure 5.7

Caribou Accidents per Kilometre per Year (1983 - 1992)

Legend

▬ 0.001

▬ 0.002

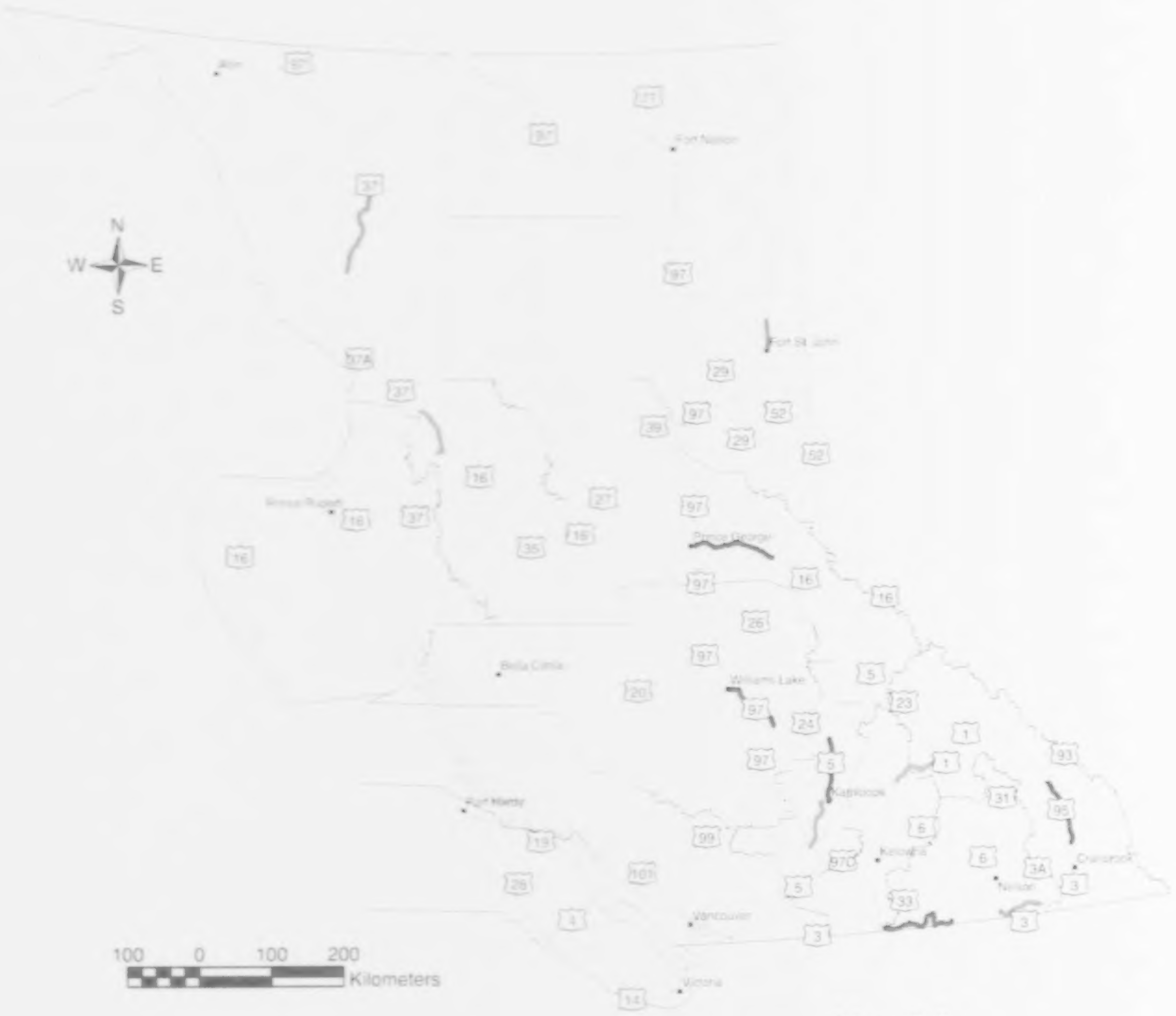
▬ 0.003

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation,
February 2004: maps produced by Ministry
of Sustainable Resource Management


N
W
E
S
Atlin
Fort Nelson
Fort St. John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Port Hardy
Kamloops
Kelowna
Nelson
Cranbrook
Vancouver
Victoria
37
37A
97
77
29
52
39
16
27
35
26
20
5
23
24
1
93
31
95
6
3A
3
33
97C
99
19
28
101
4
14
100
0
100
200
Kilometers

Map 5.8

Caribou Accidents
per Kilometre per Year
(1993 - 2002)

Legend

0.001

0.002

0.003

0.004 - 0.005

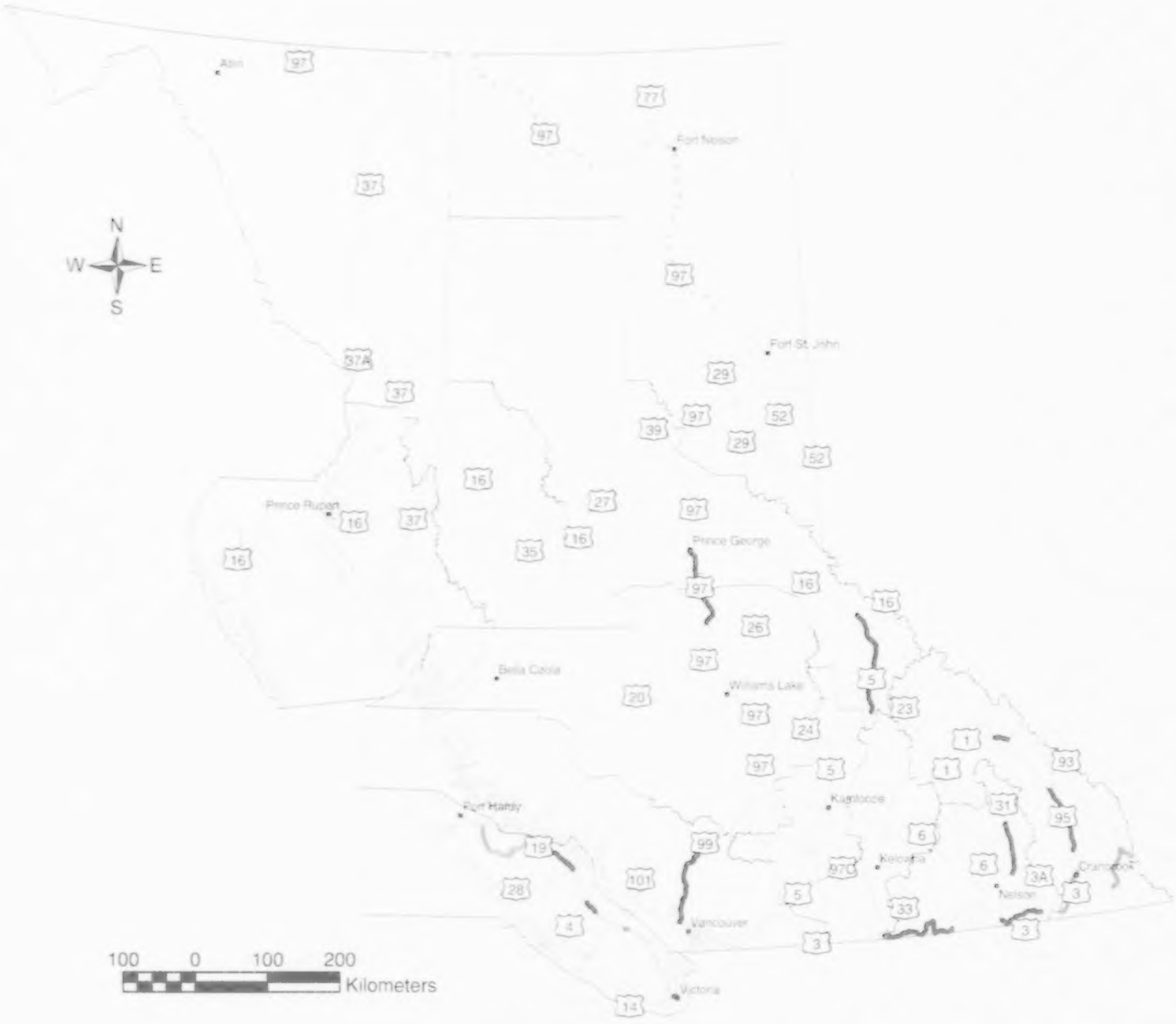
0.006 - 0.044

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004; maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
29
37A
37
39
97
52
29
52
16
27
97
Prince Rupert
16
37
16
35
16
Prince George
97
16
16
26
97
Bella Coola
5
20
Williams Lake
23
97
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
6
99
19
97C
Kelowna
6
3A
Cranbrook
28
101
5
Nelson
3
4
33
Vancouver
3
3
100 0 100 200
Kilometers
Victoria
14

Map 5.9

Total Cougar Accidents (1993 - 2002)

Legend

━━ 1

━━ 2

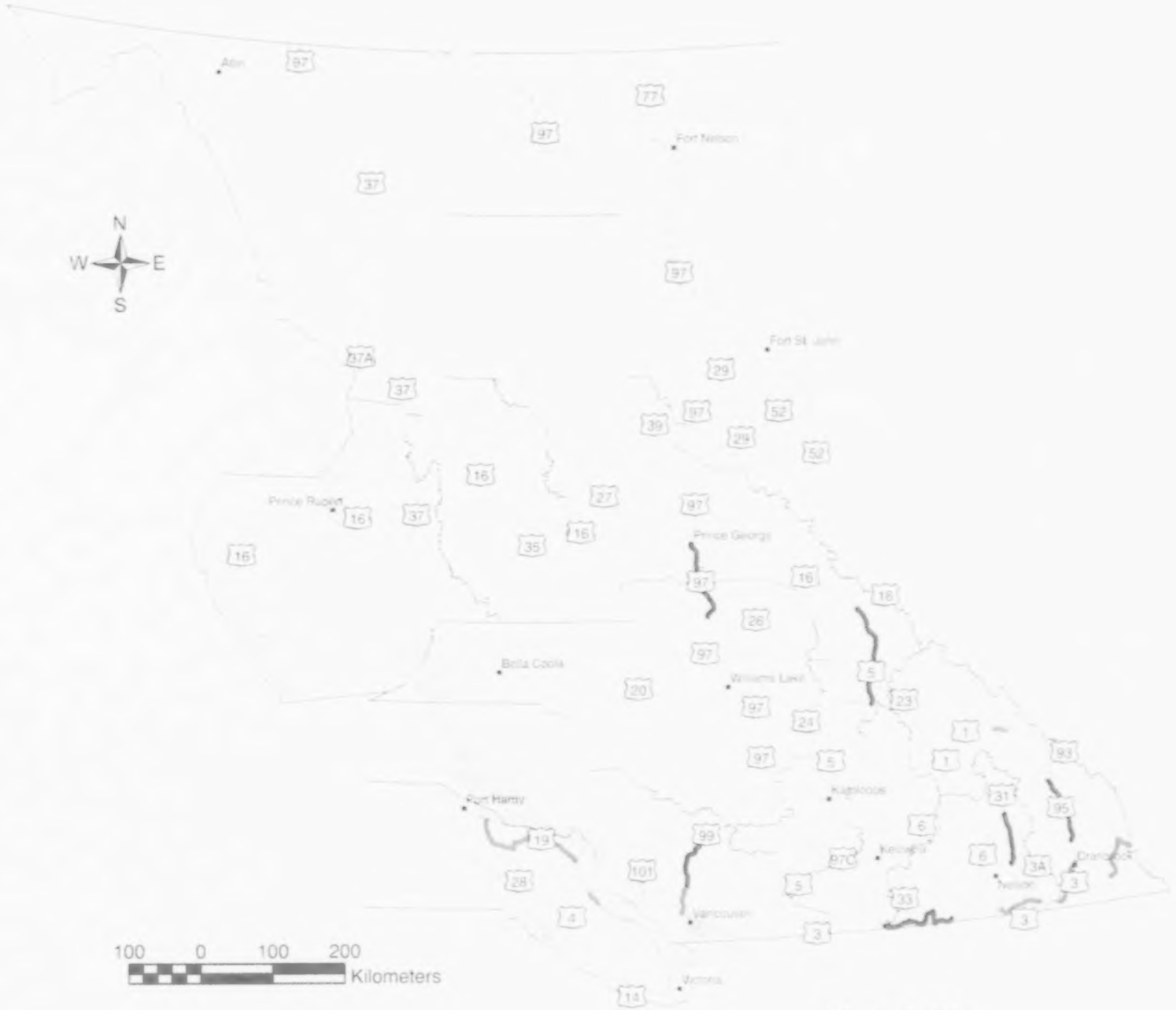
━━ 3

No Accidents Reported on LKI Segment

· · · · No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
57A
29
37
97
52
39
29
52
16
27
Prince Rupert
16
37
97
16
Prince George
35
16
97
16
16
26
Bella Coola
97
5
Williams Lake
20
97
23
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
19
99
6
97C
Kelowna
6
Cranbrook
3A
101
28
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.10

Cougar Accidents
per Kilometre per Year
(1993 - 2002)

Legend

▬ 0.001

▬ 0.002 - 0.003

▬ 0.004 - 0.006

▬ 0.007 - 0.018

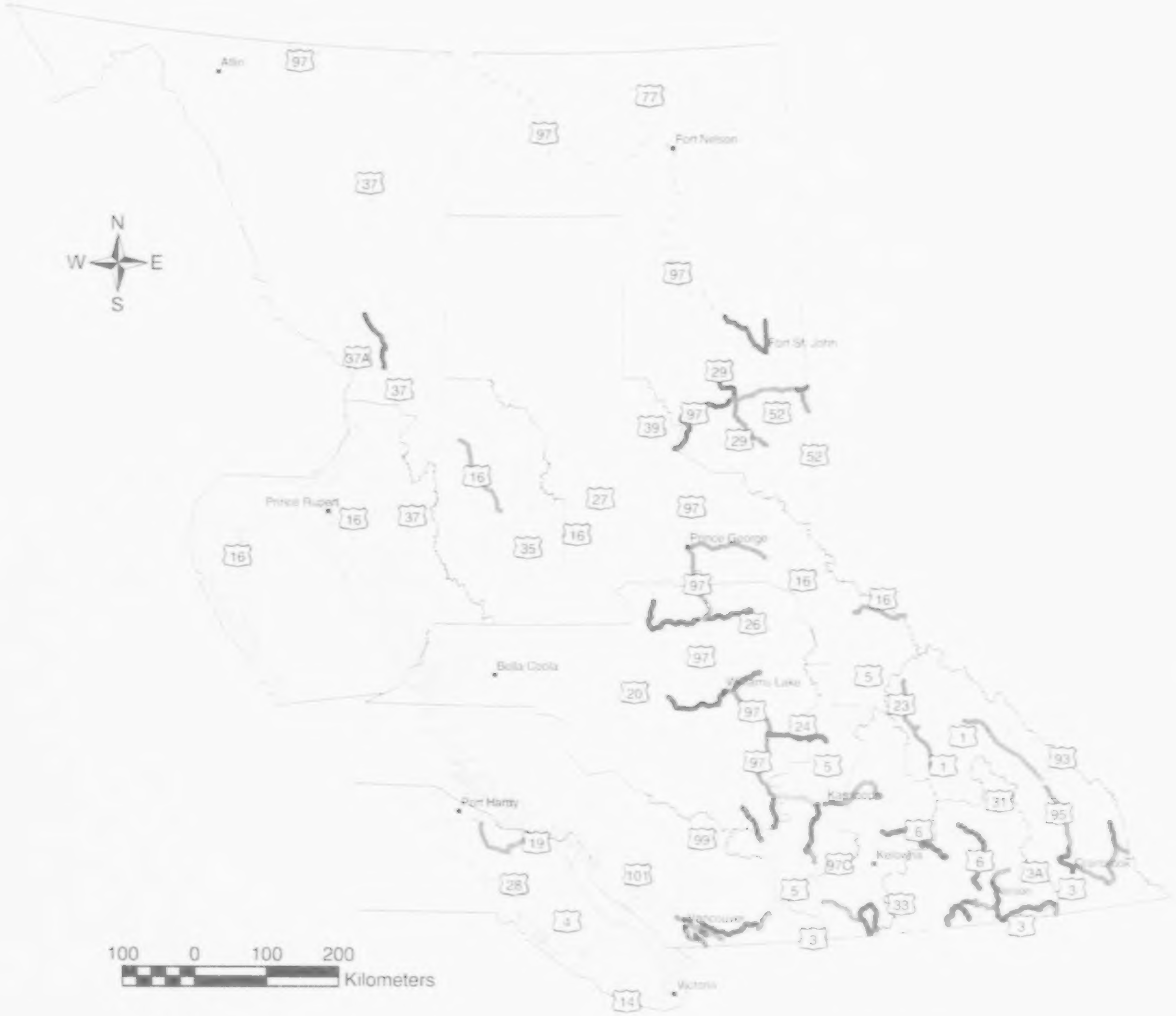
▬ 0.019 - 0.039

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004, maps produced by Ministry
of Sustainable Resource Management


N
W
E
S
Atlin
97
77
97
Fort Nelson
37
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
Prince Rupert
16
37
97
16
35
16
Prince George
97
16
16
26
Bella Coola
97
Williams Lake
20
5
23
97
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
99
19
6
Kelowna
97C
6
3A
101
28
5
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.11

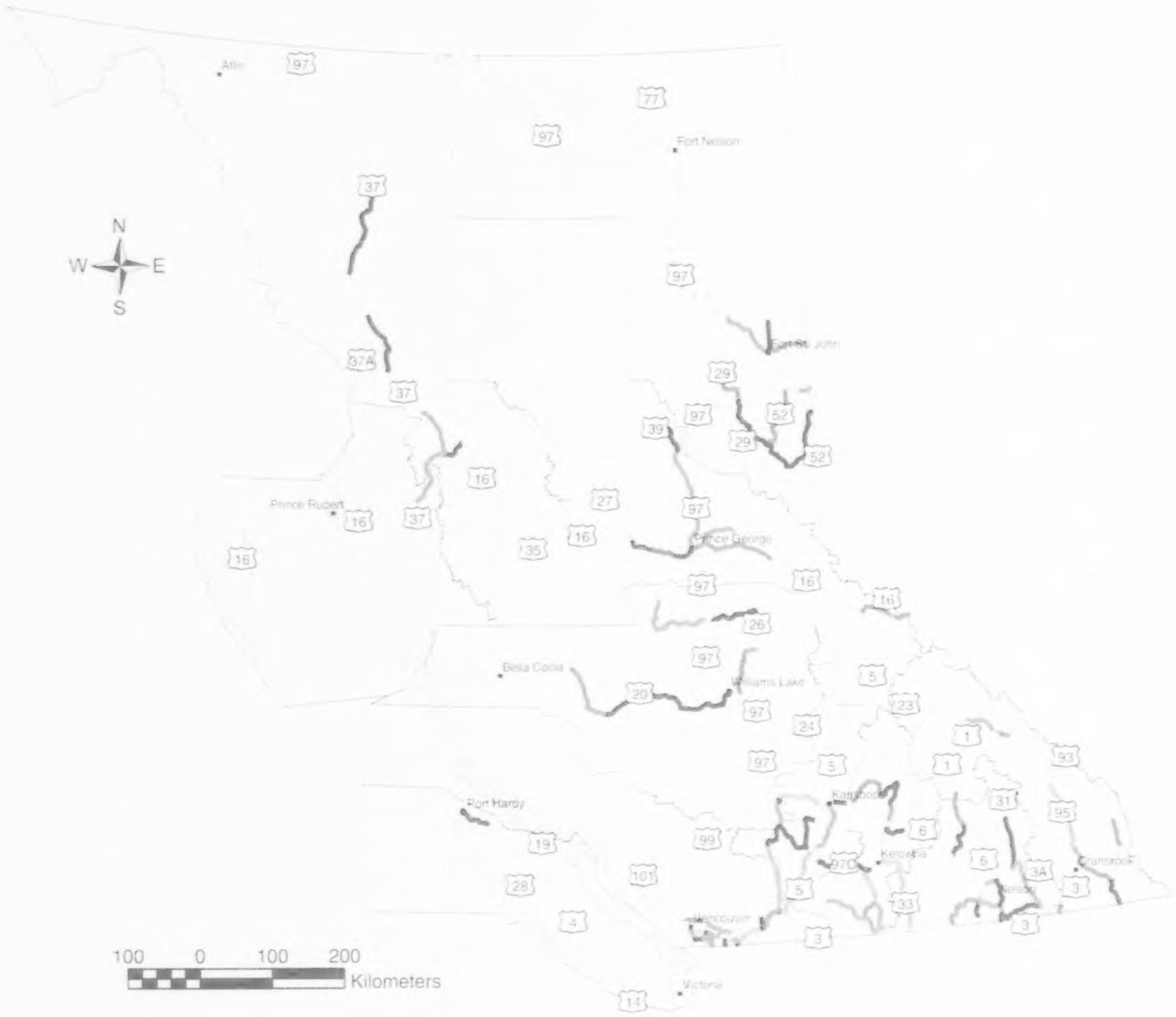
Total Coyote Accidents (1983 - 1992)

Legend

1
2 - 3
4 - 5
6 - 10
11 - 20
21 - 51
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation.
February 2004: maps produced by Ministry
of Sustainable Resource Management.


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
Prince Rupert
16
37
97
35
16
Prince George
16
97
16
16
26
97
Bella Coola
Williams Lake
5
20
97
23
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
6
99
19
Kelowna
97C
6
Cranbrook
3A
28
101
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Map 5.12

Total Coyote Accidents (1993 - 2002)

Legend

— 1

— 2 - 3

— 4 - 5

— 6 - 10

— 11 - 20

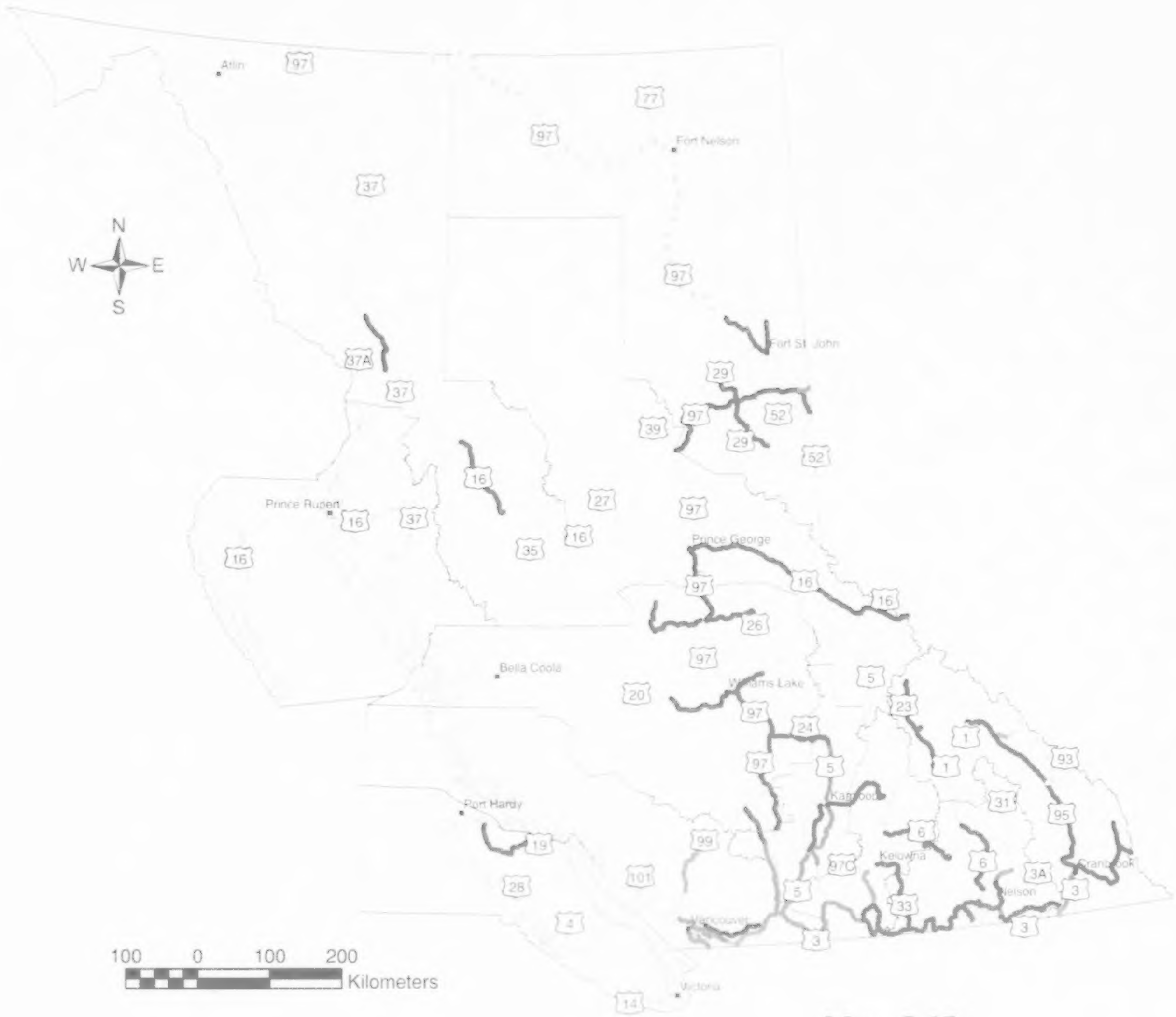
— 21 - 51

— No Accidents Reported on LKI Segment

— No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
97
Prince Rupert
16
37
35
16
16
Prince George
97
16
16
26
97
Bella Coola
20
Williams Lake
5
97
24
23
1
93
97
5
1
Kamloops
31
Port Hardy
19
99
6
95
28
101
97C
Kelowna
6
3A
Cranbrook
5
Nelson
3
Vancouver
33
4
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.13

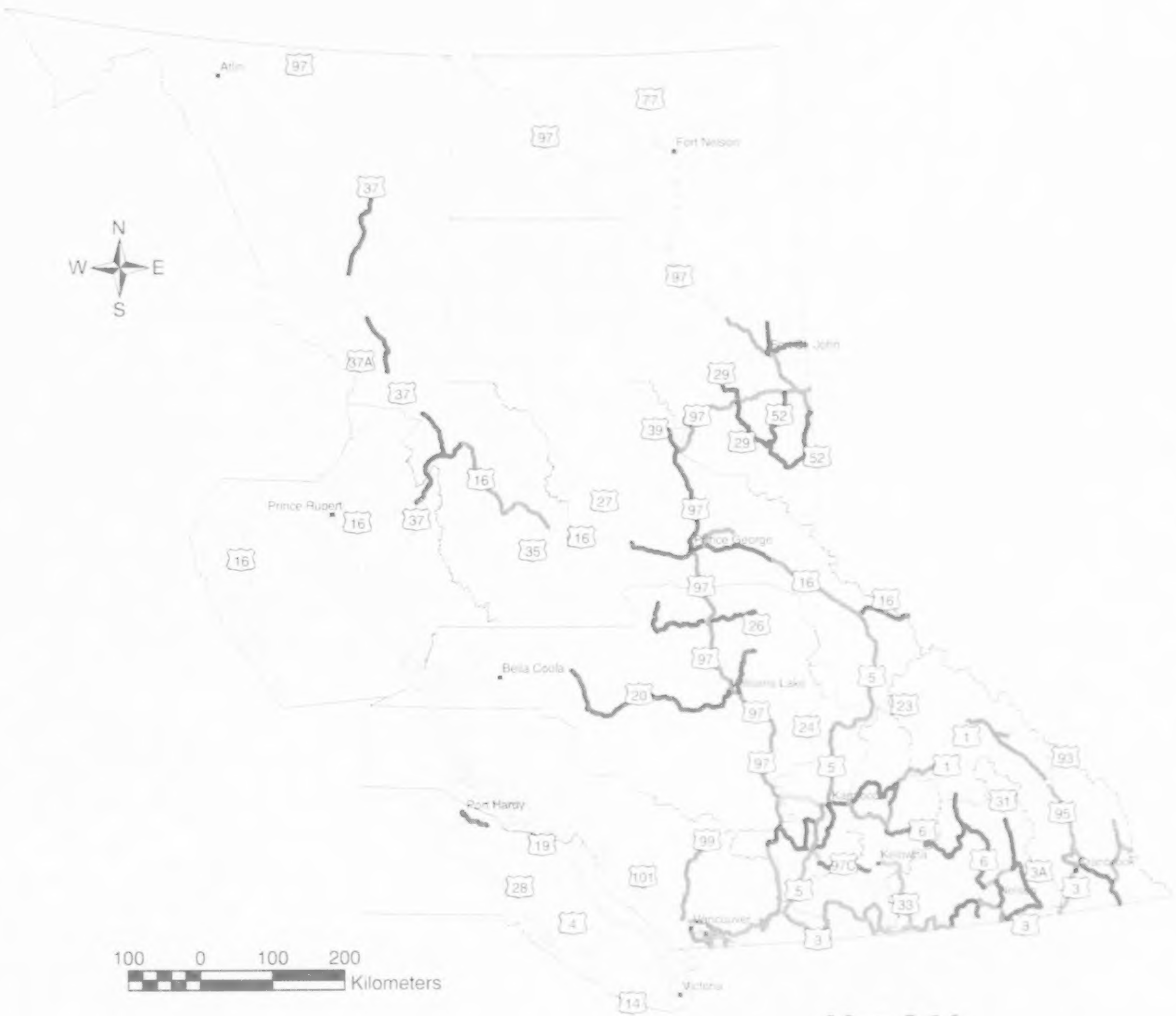
Coyote Accidents
per Kilometre per Year
(1983 - 1992)

Legend

0.001 - 0.005
0.006 - 0.015
0.016 - 0.030
0.031 - 0.060
0.061 - 1.751
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation.
February 2004; maps produced by Ministry
of Sustainable Resource Management.


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
37A
37
29
97
52
39
29
52
16
Prince Rupert
16
37
27
97
35
16
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
20
5
97
23
24
1
93
97
5
1
Port Hardy
Kamloops
31
95
19
99
6
Kelowna
6
28
101
97C
5
3A
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.14

Coyote Accidents
per Kilometre per Year
(1993 - 2002)

Legend

0.001 - 0.005

0.006 - 0.015

0.016 - 0.030

0.031 - 0.060

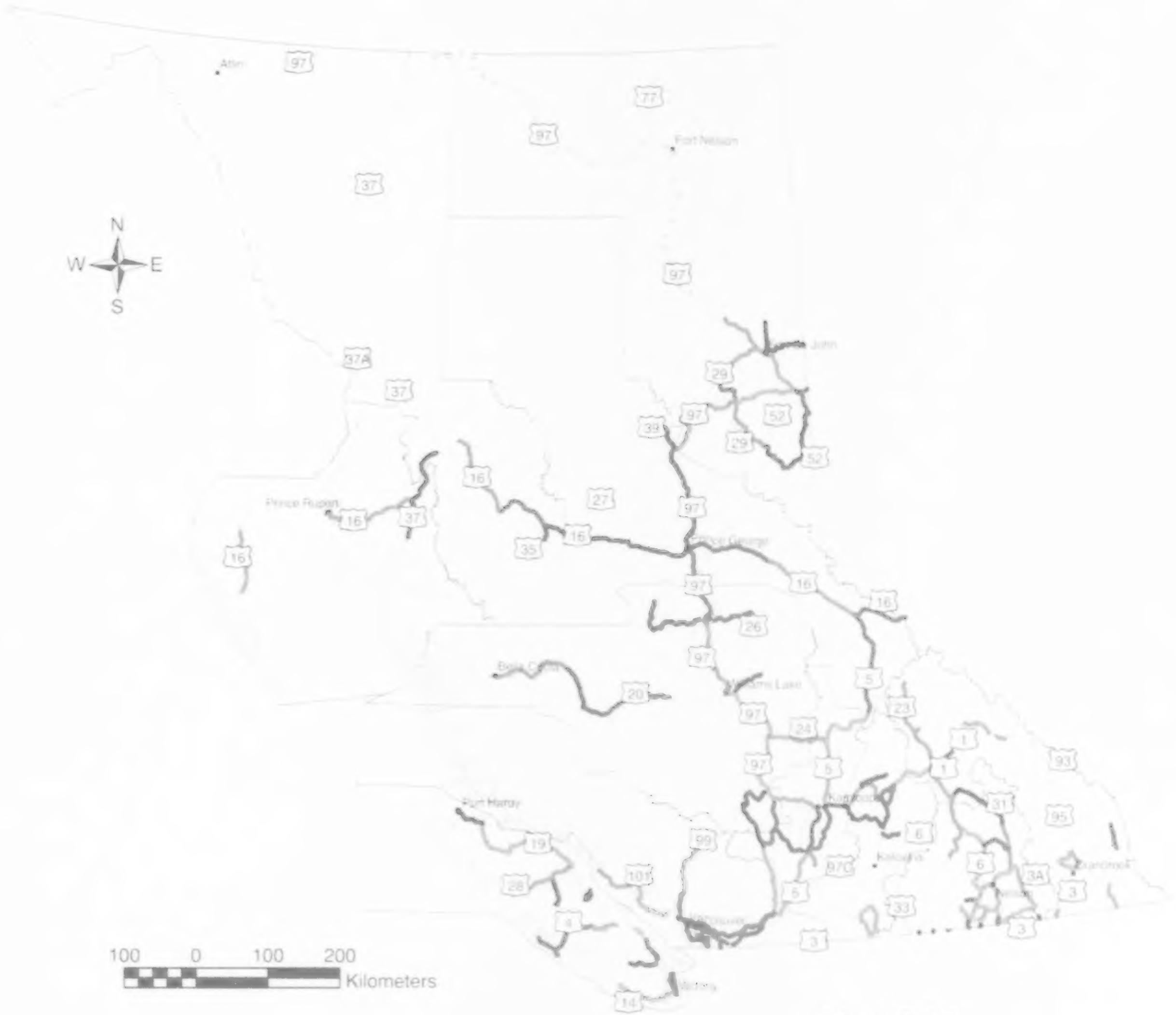
0.061 - 1.751

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


N
W
E
S
Atlin
Fort Nelson
John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Port Hardy
Kamloops
Kelowna
Nelson
Cranbrook
Vancouver
Victoria
100 0 100 200
Kilometers

Map 5.15

Total Deer Accidents (1983 - 1992)

Legend

▬ 1 - 20

▬ 21 - 50

▬ 51 - 100

▬ 101 - 250

251 - 1000

1001 - 2000

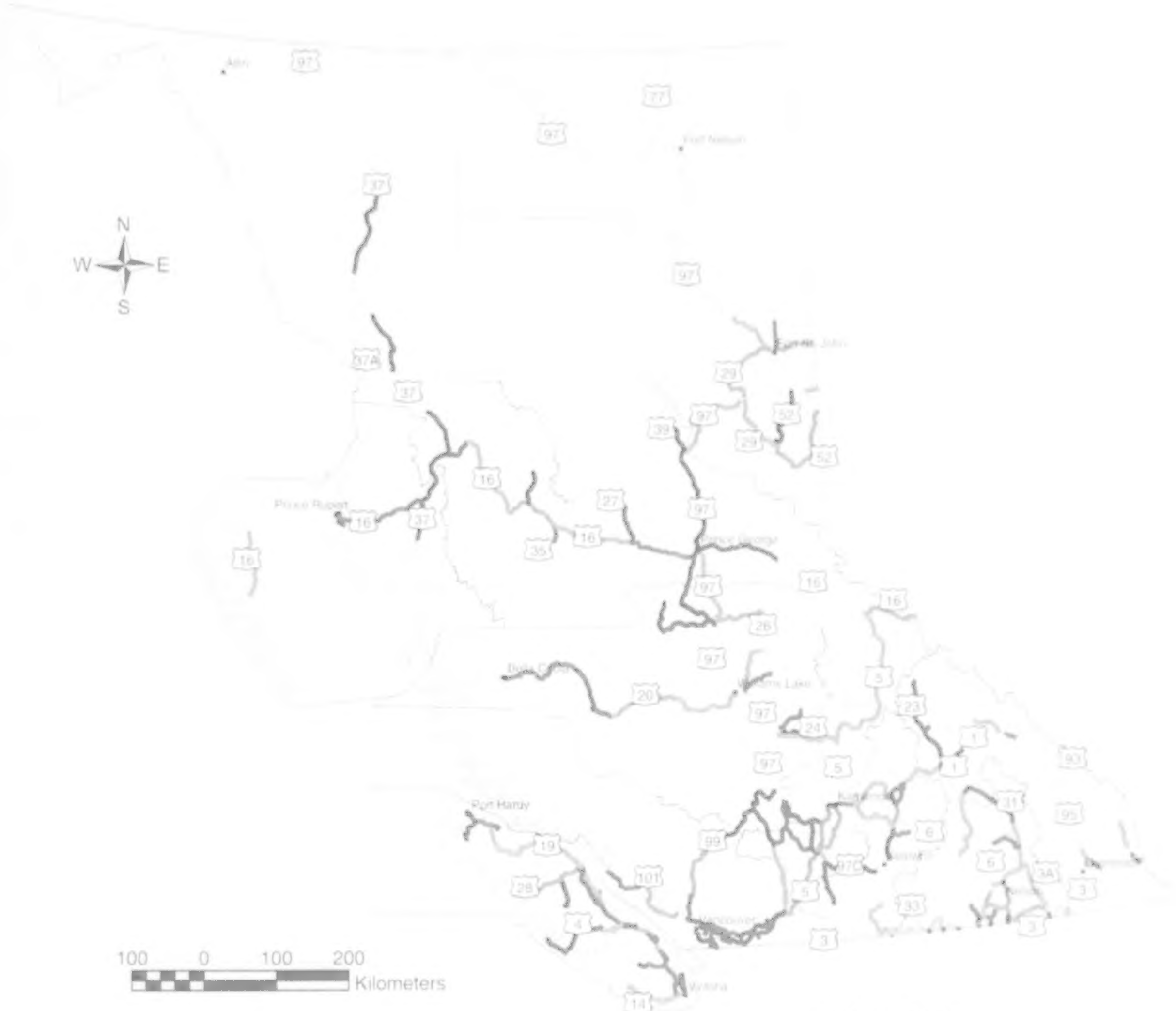
▬ 2001 - 2613

No Accidents Reported on LKI Segment

· · · No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation.
February 2004; maps produced by Ministry
of Sustainable Resource Management.


N
W
E
S
Atlin
97
77
97
Fort Nelson
37
97
Fort St. John
37A
37
29
97
52
39
29
52
16
Prince Rupert
16
37
27
97
35
16
Prince George
16
97
16
16
28
97
Bella Coola
20
Williams Lake
5
97
23
24
1
1
97
5
93
Port Hardy
Kamloops
31
95
19
99
6
Kelowna
6
28
101
97C
3A
5
3
4
Vancouver
33
3
3
14
Victoria
100 0 100 200
Kilometers

Map 5.16

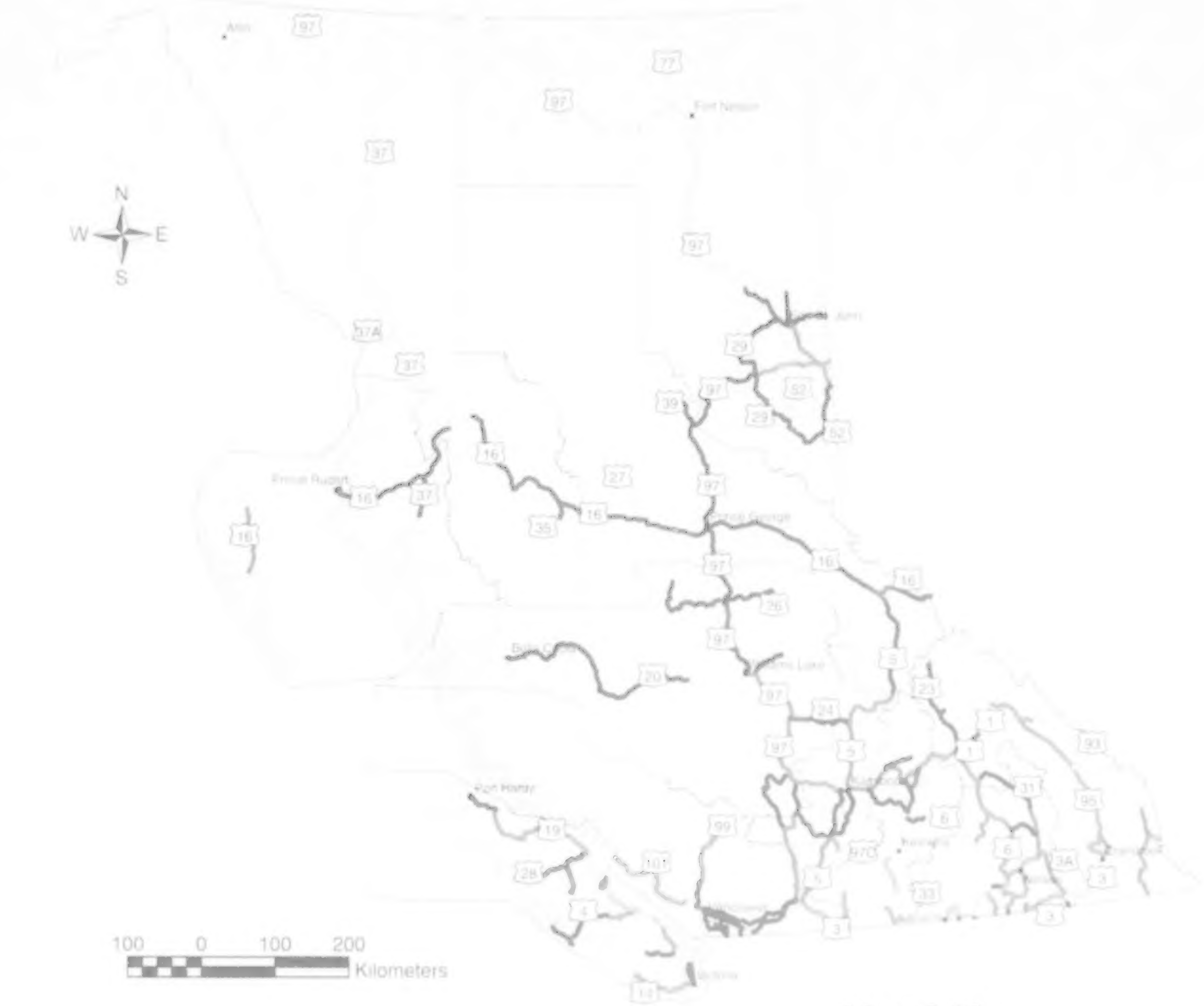
Total Deer Accidents (1993 - 2002)

Legend

— 1 - 20
— 21 - 50
— 51 - 100
— 101 - 250
251 - 1000
1001 - 2000
— 2001 - 2613
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
Prince Rupert
16
37
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
5
Williams Lake
20
97
23
24
1
97
5
1
93
Port Hardy
31
95
19
99
6
97C
Kelowna
6
28
101
3A
3
5
4
33
3
3
Vancouver
14
Victoria
100
0
100
200
Kilometers

Map 5.17

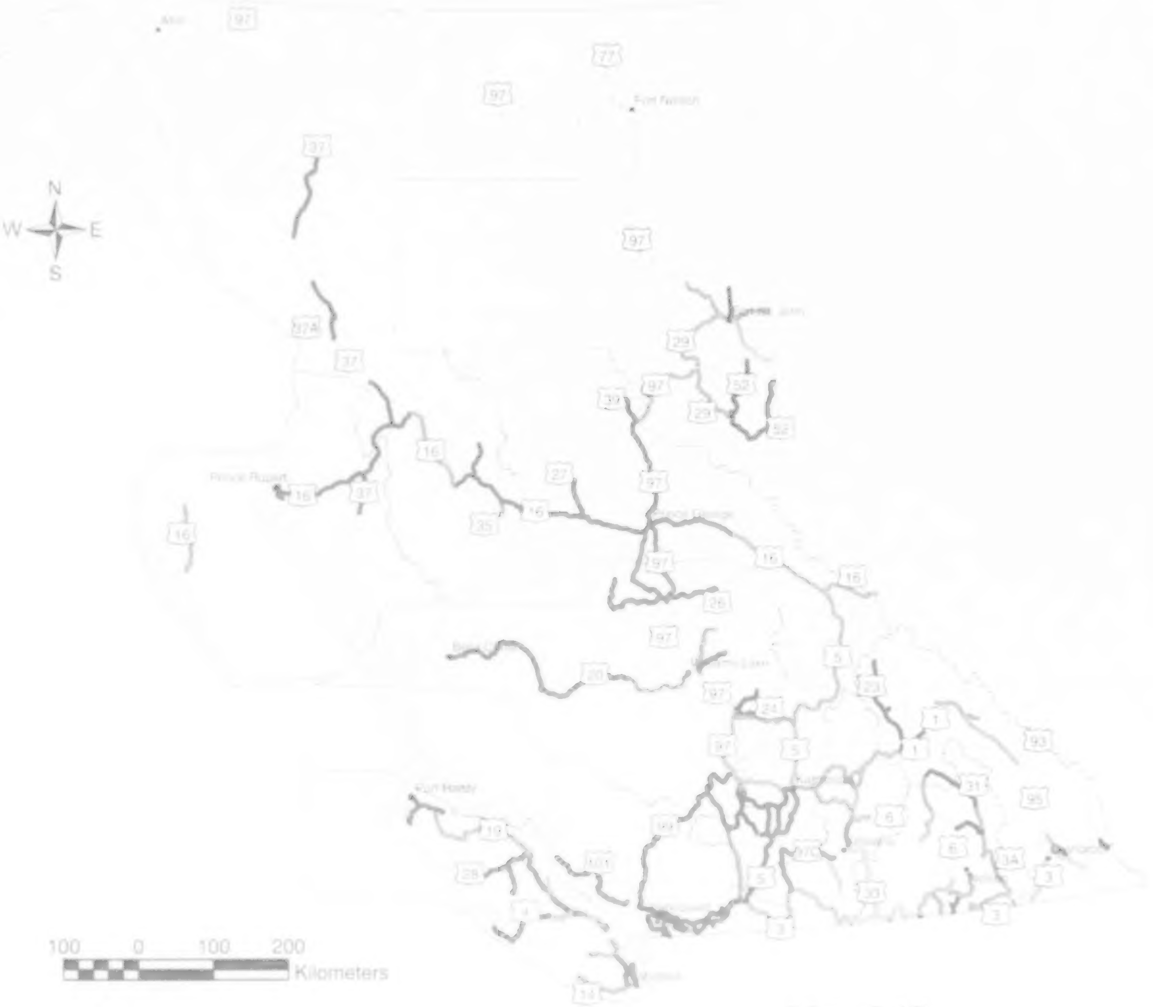
Deer Accidents
per Kilometre per Year
(1983 - 1992)

Legend

0.001 - 0.100
0.101 - 0.300
0.301 - 0.500
0.501 - 1.000
1.001 - 10.000
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation
February 2004; maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
29
37
97
52
39
29
52
16
Prince Rupert
16
37
27
97
Prince George
35
16
16
97
16
16
26
97
Bella Coola
20
Williams Lake
5
97
24
23
1
97
5
1
93
Port Hardy
31
95
99
6
19
97C
6
28
101
5
3A
4
3
30
3
3
14
Victoria
100
0
100
200
Kilometers

Map 5.18

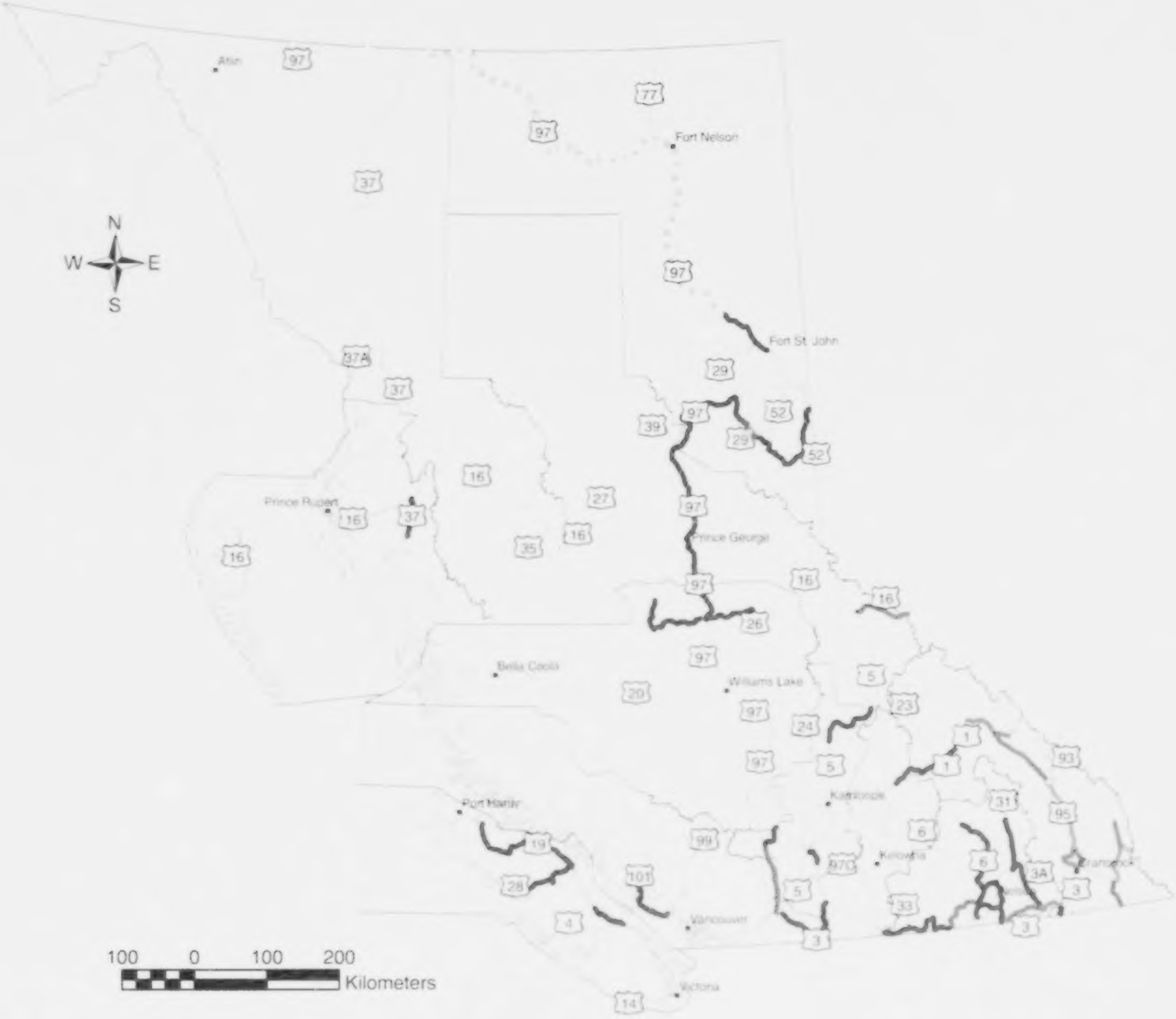
Deer Accidents
per Kilometre per Year
(1993 - 2002)

Legend

0.001 - 0.100
0.101 - 0.300
0.301 - 0.500
0.501 - 1.000
1.001 - 10.000
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialists
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St John
37A
37
29
39
97
52
29
52
16
27
Prince Rupert
16
37
97
16
35
16
16
Prince George
97
16
16
26
97
Bella Coola
20
Williams Lake
5
23
97
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
99
6
19
97C
Kelowna
6
3A
Cranbrook
28
101
5
3
Nelson
4
33
Vancouver
3
3
Victoria
14
100 0 100 200
Kilometers

Map 5.19

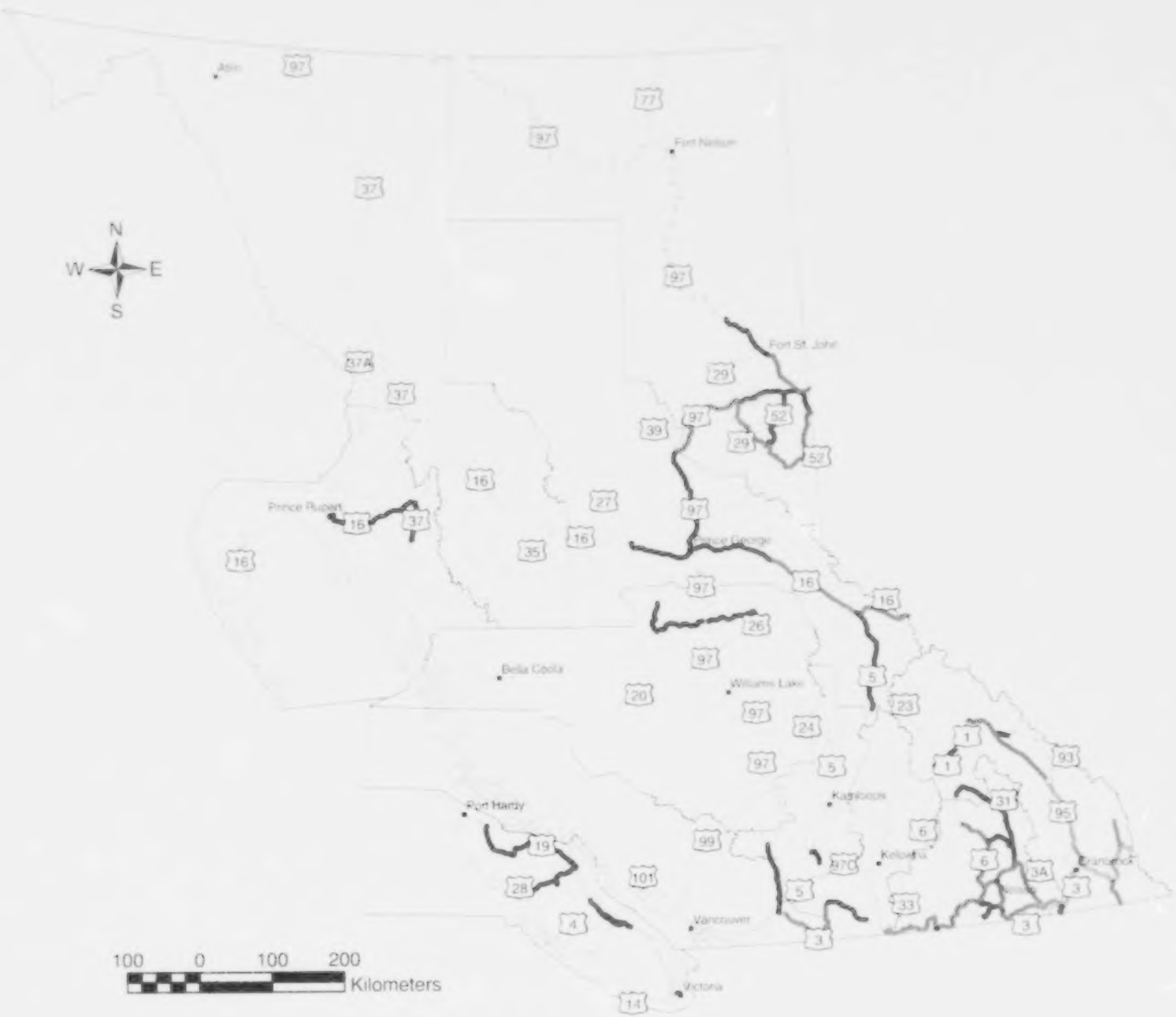
Total Elk Accidents (1983 - 1992)

Legend

▬ 1 - 5
▬ 6 - 20
▬ 21 - 50
▬ 51 - 100
▬ 101 - 187
No Accidents Reported on LKI Segment
- - - No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002. Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation,
February 2004; maps produced by Ministry
of Sustainable Resource Management



Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
29
37
97
52
39
29
52
16
27
Prince Rupert
16
37
97
35
16
Prince George
16
97
16
16
26
97
Bella Coola
5
20
Williams Lake
23
97
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
99
6
19
97C
Kelowna
6
3A
Cranbrook
28
101
5
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.20

Total Elk Accidents (1993 - 2002)

Legend

1 - 5

6 - 20

21 - 50

51 - 100

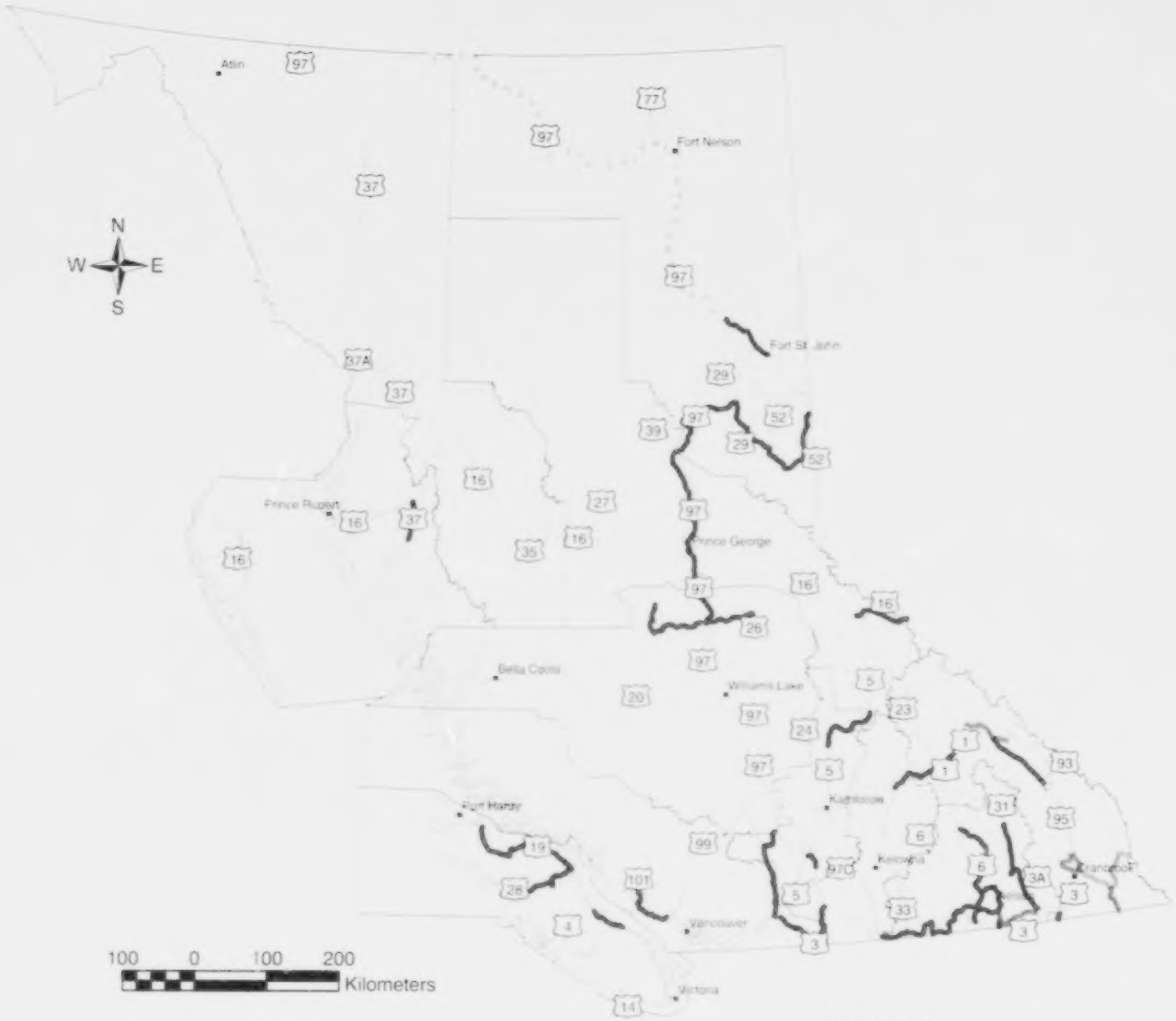
101 - 187

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
Fort Nelson
Fort St. John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Port Hardy
Kamloops
Kelowna
Vancouver
Victoria
Cranbrook
N
W
E
S
100
0
100
200
Kilometers

Map 5.21

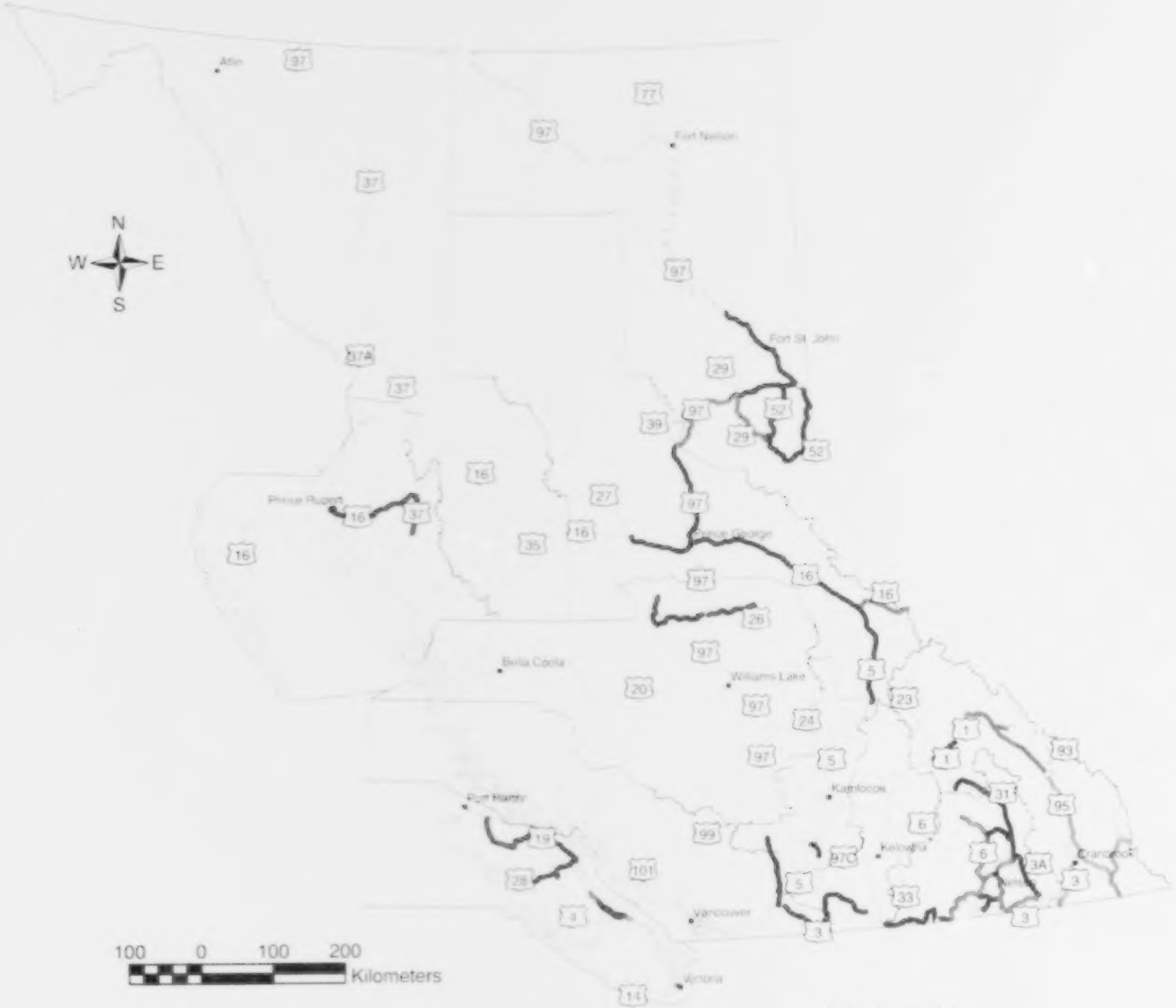
Elk Accidents
per Kilometre per Year
(1983 - 1992)

Legend

— 0.001 - 0.010
— 0.011 - 0.030
— 0.031 - 0.060
0.061 - 0.120
— 0.121 - 0.282
No Accidents Reported on LKI Segment
- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation.
February 2004; maps produced by Ministry
of Sustainable Resource Management.


N
W
E
S
Atlin
97
77
97
Fort Nelson
37
97
Fort St. John
37A
29
37
97
52
39
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
16
97
16
26
5
97
Bella Coola
20
Williams Lake
23
97
24
1
93
1
97
5
Kamloops
31
95
Port Hardy
19
6
99
97C
Kelowna
6
3A
Cranbrook
28
101
5
3
33
3
4
Vancouver
3
14
Victoria
100
0
100
200
Kilometers

Map 5.22

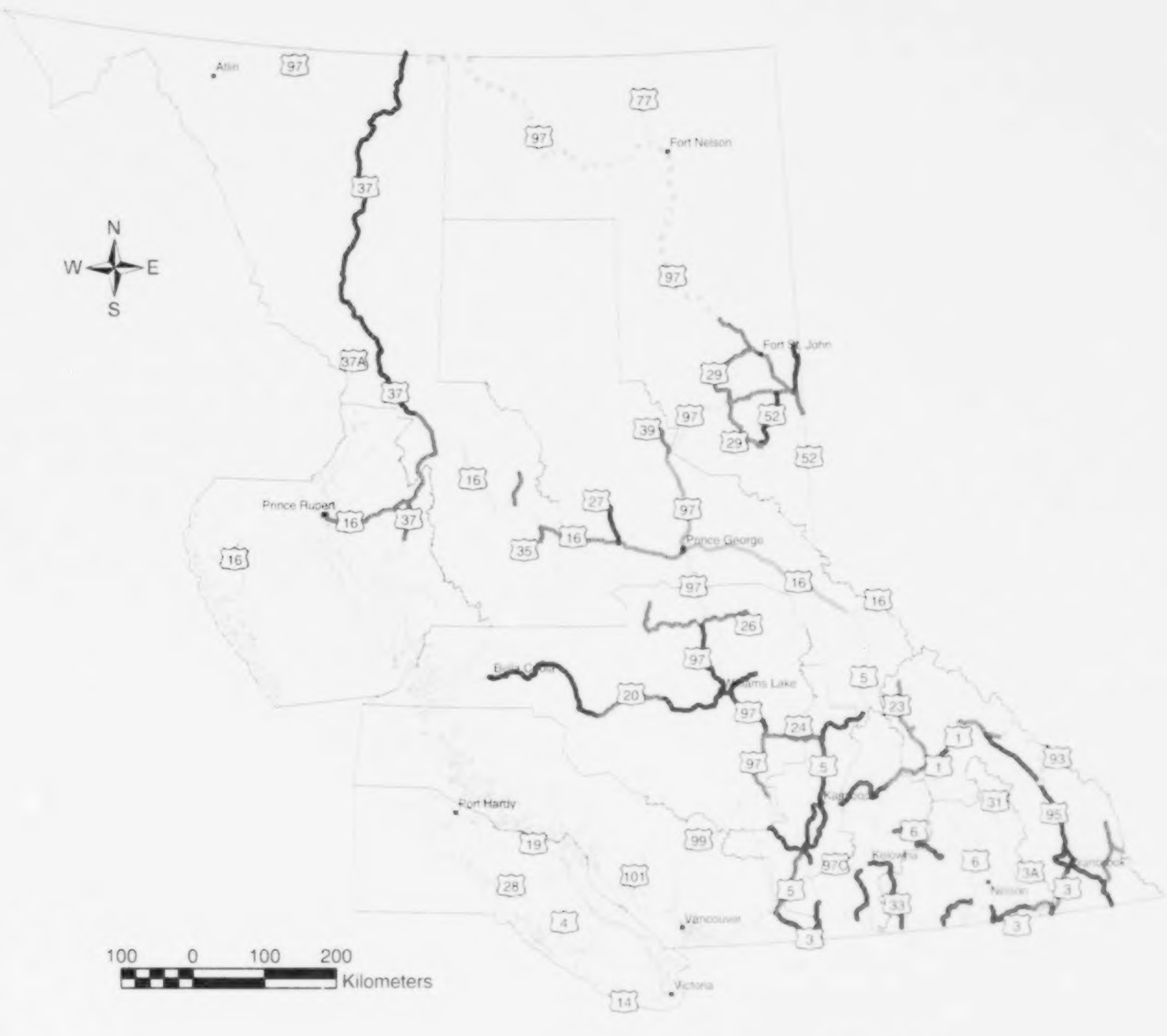
Elk Accidents
per Kilometre per Year
(1993 - 2002)

Legend

— 0.001 - 0.010
— 0.011 - 0.030
— 0.031 - 0.060
0.061 - 0.120
— 0.121 - 0.282
No Accidents Reported on LKI Segment
- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
29
37A
37
97
52
39
29
52
16
27
Prince Rupert
16
37
97
16
35
Prince George
16
97
16
16
26
97
Bella Coola
20
Williams Lake
5
23
97
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
19
99
6
97C
Kelowna
6
3A
Cranbrook
101
28
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Map 5.23

Total Moose Accidents (1983 - 1992)

Legend

▬ 1 - 5

▬ 6 - 20

▬ 21 - 50

▬ 51 - 100

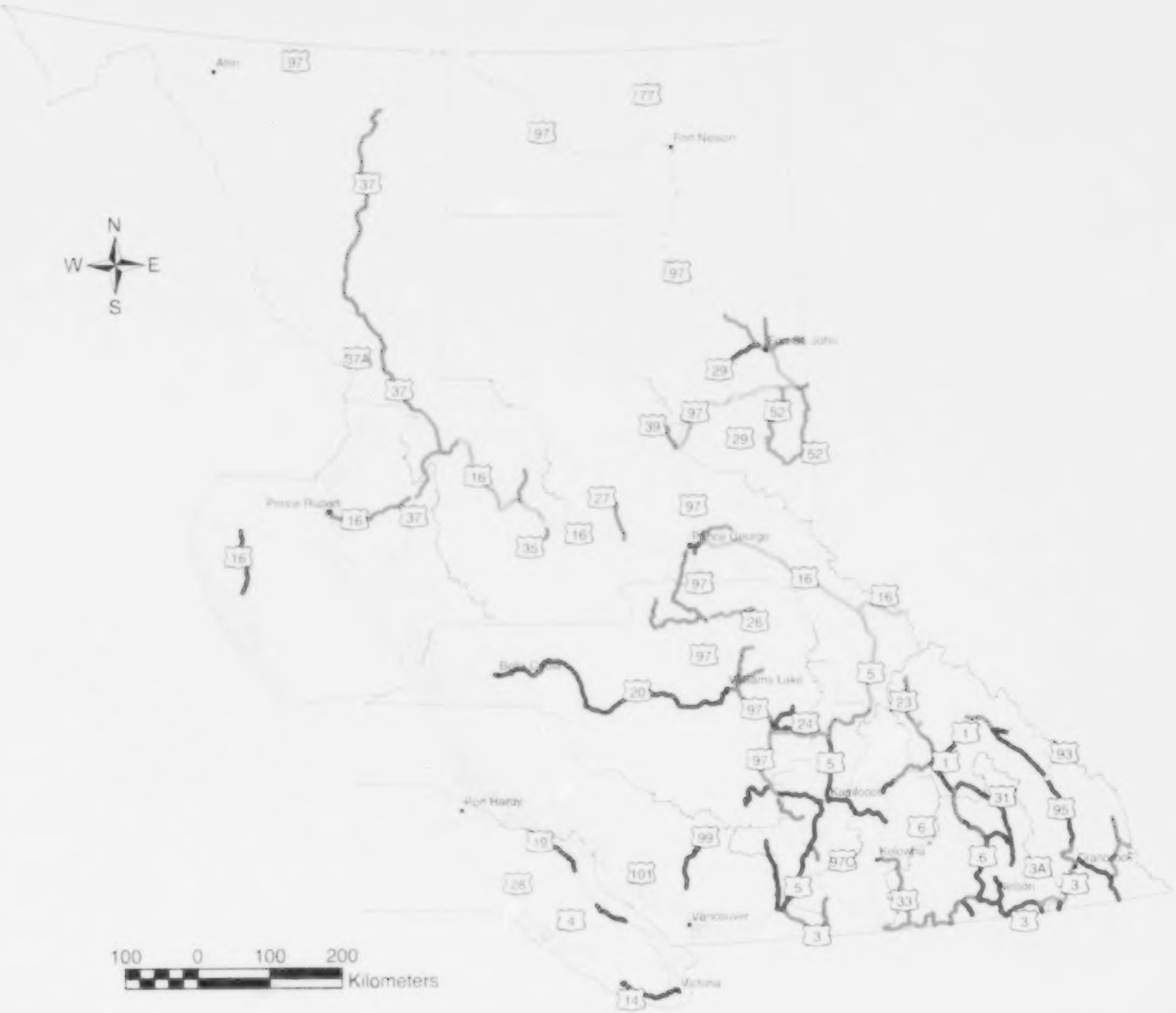
▬ 101 - 256

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location
and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004; maps produced by Ministry
of Sustainable Resource Management



Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
29
37A
37
97
52
39
29
52
16
27
97
Prince Rupert
16
37
16
35
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
5
20
23
97
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
6
19
99
Kelowna
6
97C
Cranbrook
3A
101
28
5
33
Nelson
3
4
Vancouver
3
3
Victoria
14
100 0 100 200
Kilometers

Map 5.24

Total Moose Accidents (1993 - 2002)

Legend

— 1 - 5

— 6 - 20

— 21 - 50

51 - 100

— 101 - 256

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
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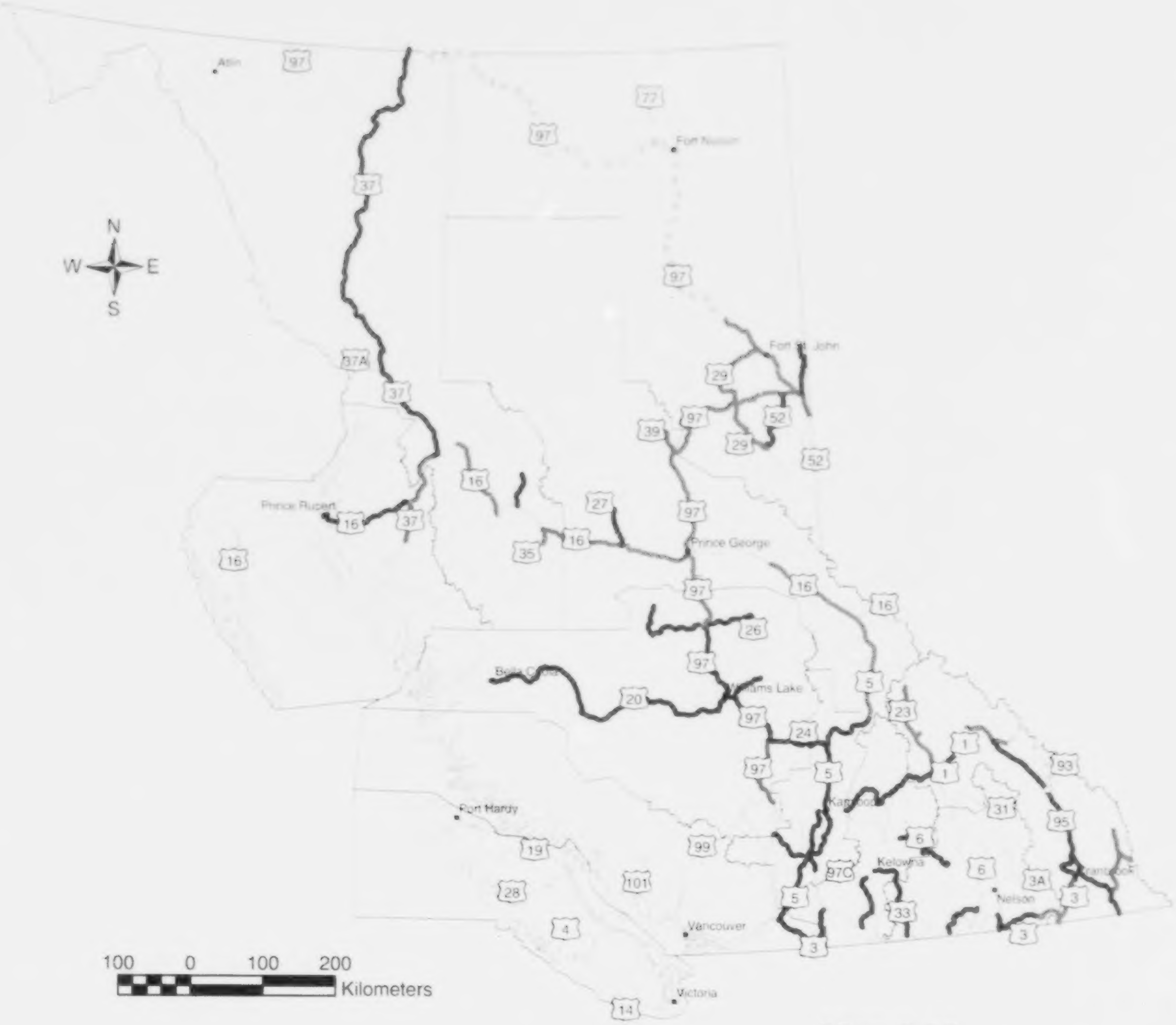

N
W
E
S
Atlin
Fort Nelson
Fort St. John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Kamloops
Kelowna
Nelson
Cranbrook
Port Hardy
Vancouver
Victoria
97
77
37
37A
29
52
39
16
27
35
26
20
5
23
24
1
93
31
95
6
3A
3
33
97C
99
19
28
101
4
14
100
0
100
200
Kilometers

Map 5.25

Moose Accidents
per Kilometre per Year
(1983 - 1992)

Legend

▬ 0.001 - 0.015

▬ 0.016 - 0.045

▬ 0.046 - 0.090

0.091 - 0.180

▬ 0.181 - 0.360

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002. Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation.
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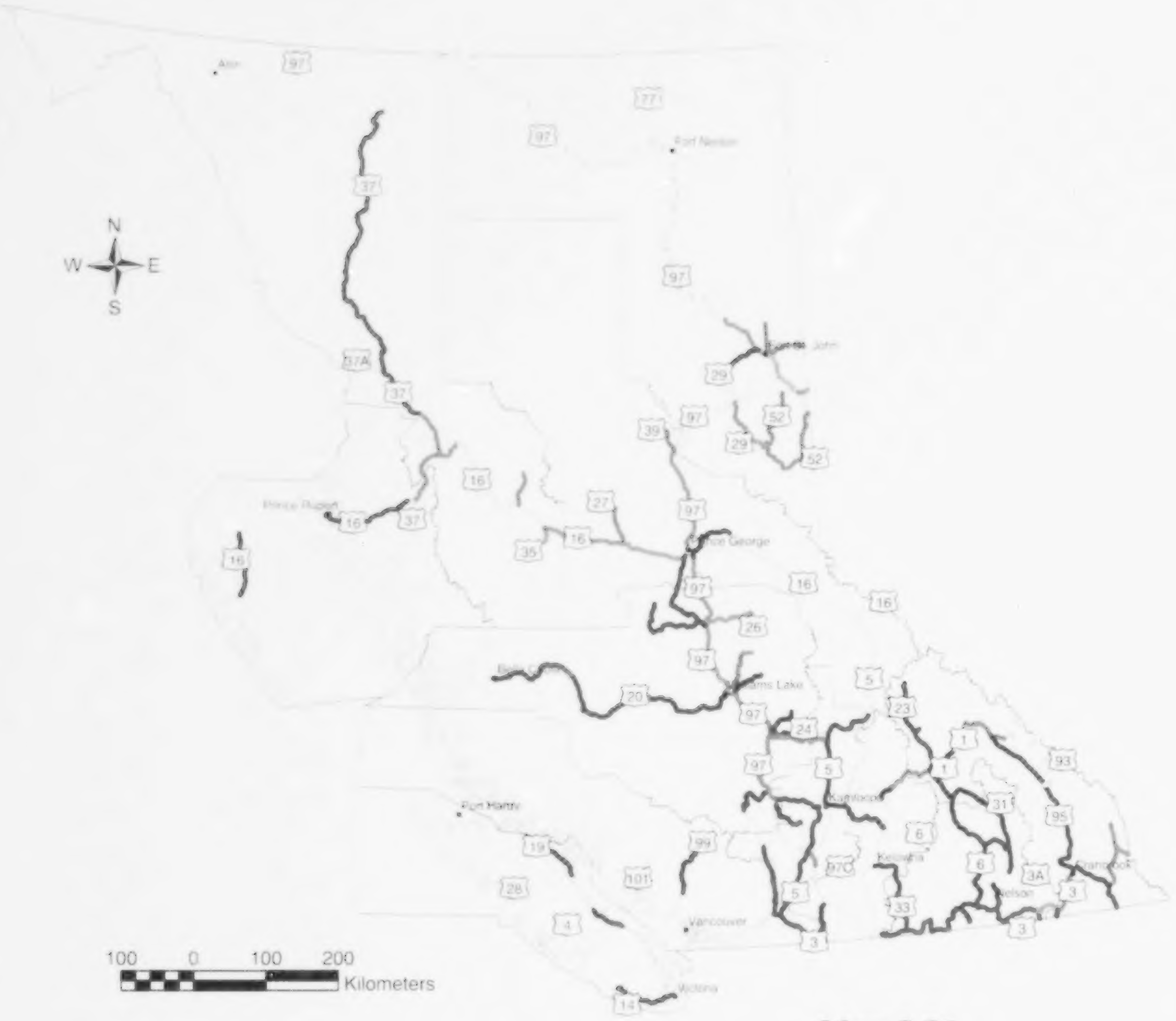
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37A
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29
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16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
20
Williams Lake
5
23
97
24
1
97
5
1
93
Kamloops
31
Port Hardy
95
19
99
6
101
97C
Kelowna
6
3A
Cranbrook
28
5
Nelson
3
4
33
Vancouver
3
3
Victoria
14
100
0
100
200
Kilometers

Map 5.26

Moose Accidents
per Kilometre per Year
(1993 - 2002)

Legend

▬ 0.001 - 0.015

▬ 0.016 - 0.045

▬ 0.046 - 0.090

▬ 0.091 - 0.180

▬ 0.181 - 0.360

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
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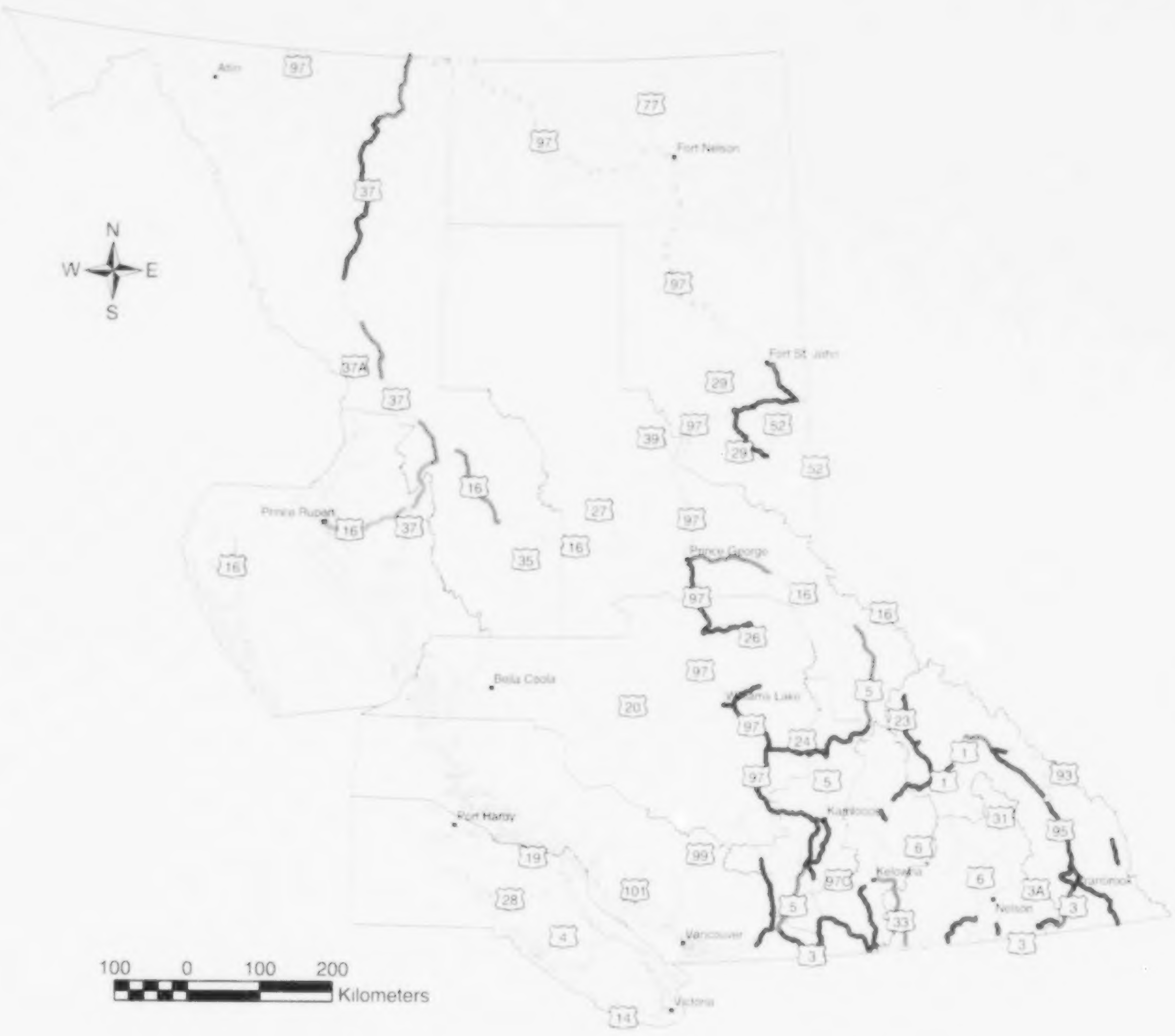
of Sustainable Resource Management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97
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Fort Nelson
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Fort St. John
37A
29
37
97
52
39
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
5
20
23
97
24
1
93
97
5
1
Kamloops
31
Port Hardy
95
99
6
19
Kelowna
97C
6
3A
Cranbrook
28
101
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Map 5.27

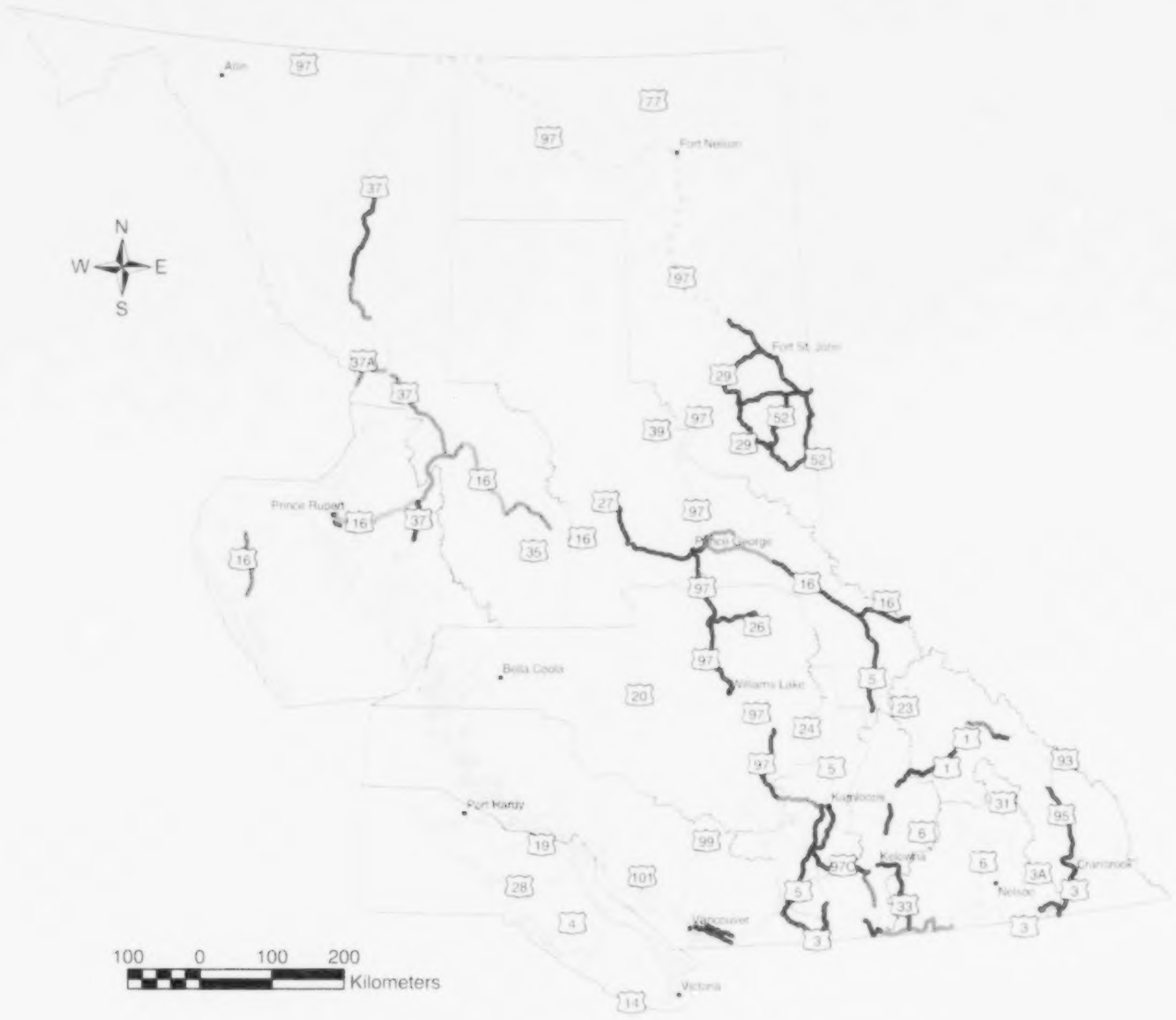
Total Porcupine Accidents (1983 - 1992)

Legend

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 50
- 51 - 158
- No Accidents Reported on LKI Segment
- No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation,
February 2004; maps produced by Ministry
of Sustainable Resource Management.


Atlin
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77
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Fort Nelson
37
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S
97
Fort St. John
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37A
37
97
52
39
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
16
97
16
26
Bella Coola
97
20
Williams Lake
5
97
23
24
1
93
97
5
1
Kamloops
31
95
6
99
19
97C
Kelowna
6
3A
Cranbrook
Port Hardy
101
28
5
Nelson
3
33
Vancouver
4
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.28

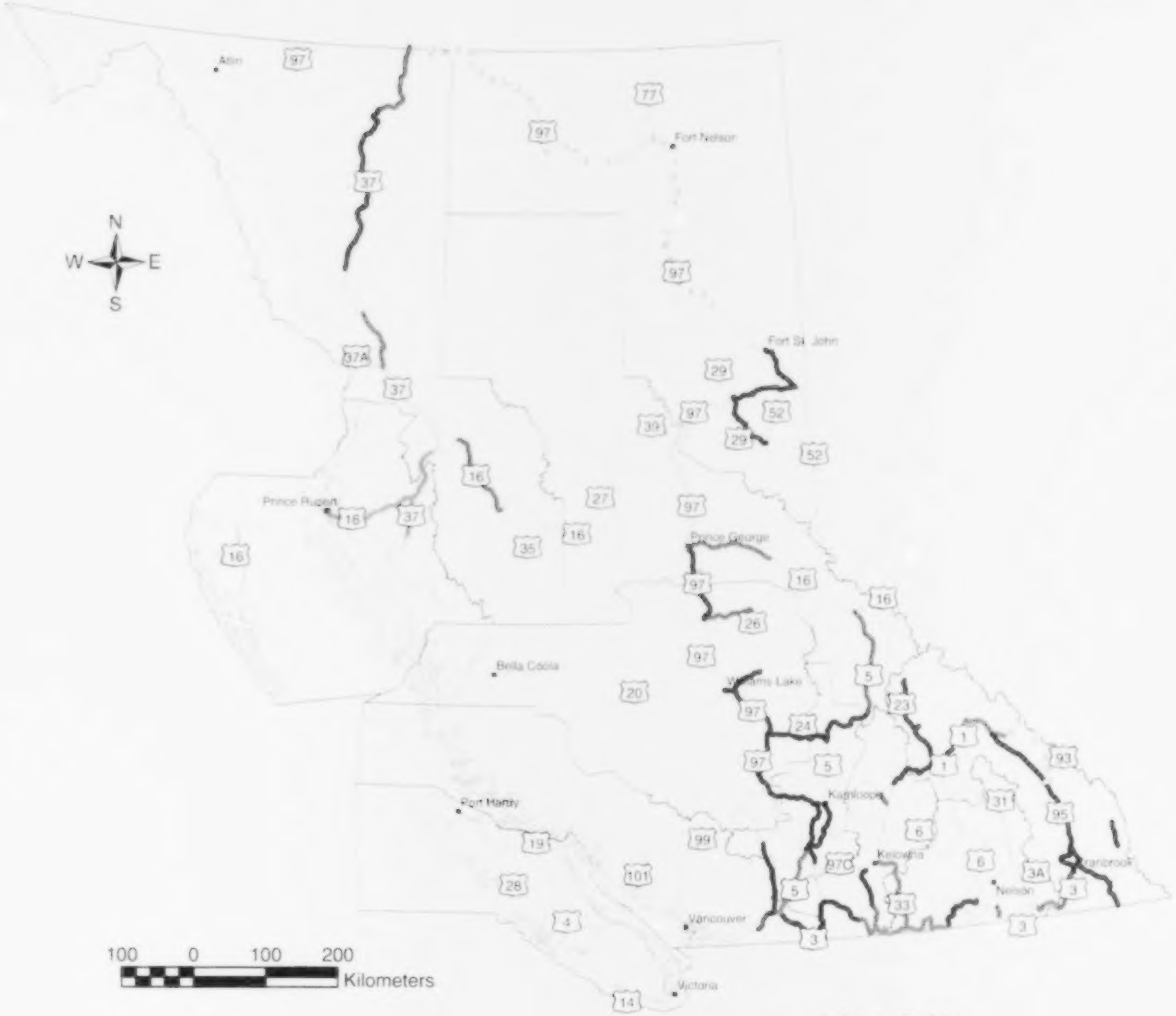
Total Porcupine Accidents (1993 - 2002)

Legend

— 1 - 5
— 6 - 10
— 11 - 20
— 21 - 50
— 51 - 158
No Accidents Reported on LKI Segment
- - - No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002 Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004 maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
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E
S
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
Prince Rupert
16
37
97
35
16
Prince George
97
16
16
26
97
Bella Coola
20
Williams Lake
5
23
97
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
19
6
99
97C
Kelowna
6
3A
Cranbrook
101
28
5
33
Nelson
3
Vancouver
4
3
3
Victoria
14
100 0 100 200
Kilometers

Map 5.29

Porcupine Accidents per Kilometre per Year (1983 - 1992)

Legend

▬ 0.001 - 0.005

▬ 0.006 - 0.010

▬ 0.011 - 0.020

▬ 0.021 - 0.050

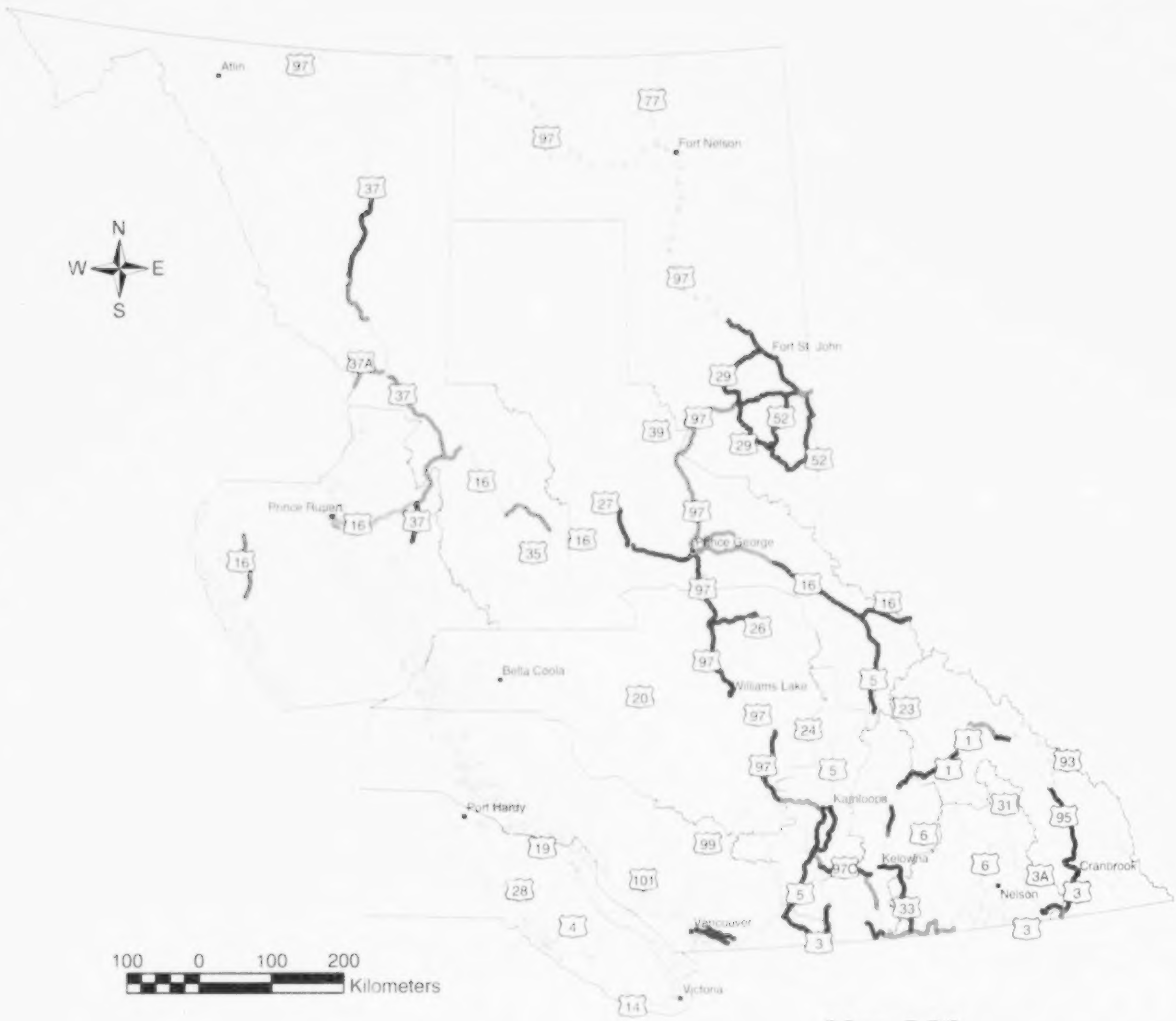
▬ 0.051 - 0.175

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002. Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation.
February 2004; maps produced by Ministry
of Sustainable Resource Management.



N
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E
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Atlin
97
77
97
Fort Nelson
37
97
Fort St. John
29
37A
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97
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39
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52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
5
20
97
24
23
1
97
5
1
93
Kamloops
Port Hardy
31
95
19
99
6
101
97C
Kelowna
6
28
5
3A
Cranbrook
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
Victoria
14

Map 5.30

Porcupine Accidents per Kilometre per Year (1993 - 2002)

Legend

0.001 - 0.005

0.006 - 0.010

0.011 - 0.020

0.021 - 0.050

0.051 - 0.175

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes

(1) Reported Species not verified by wildlife specialist

(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation,
February 2004; maps produced by Ministry
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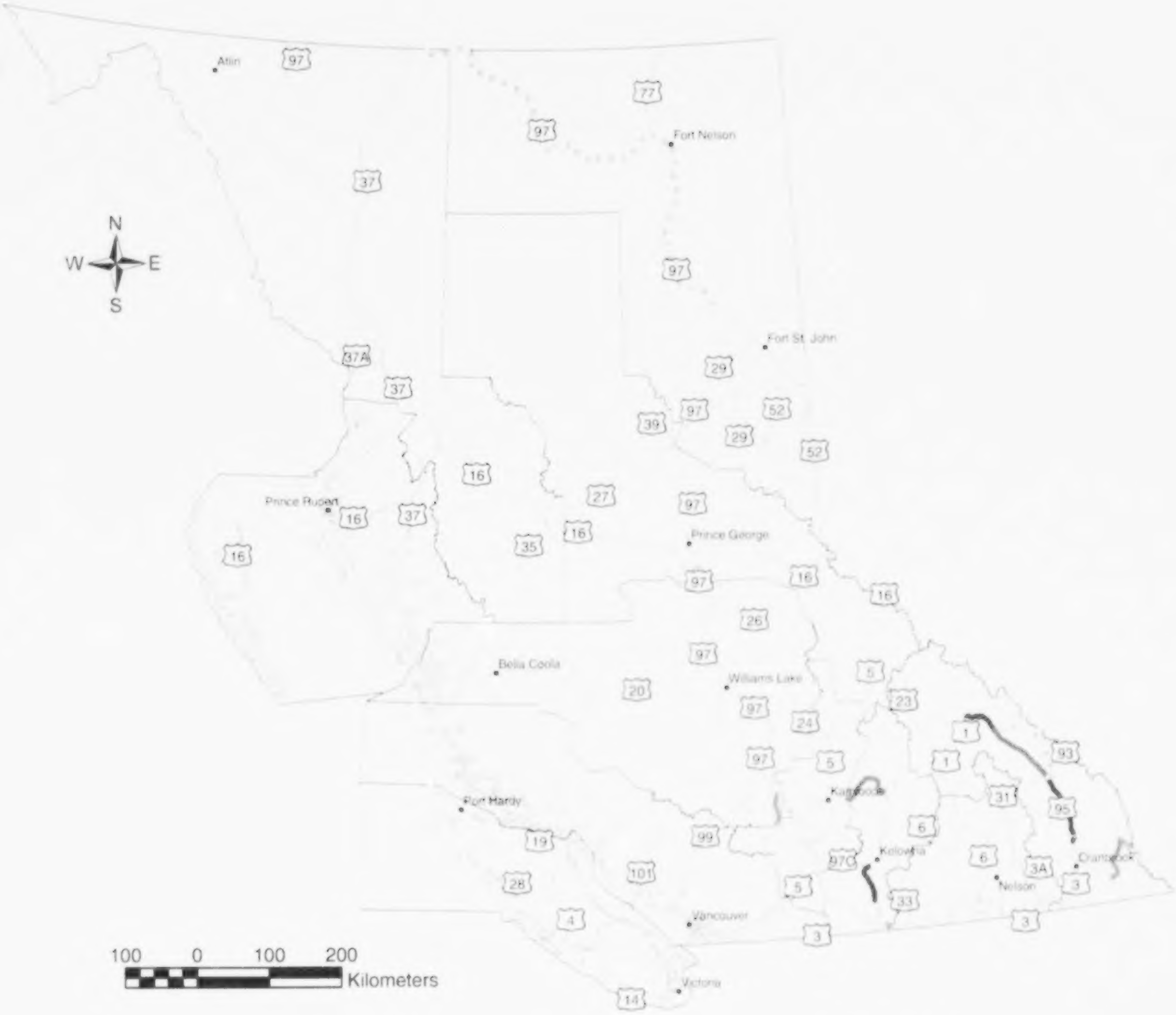

Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
37
29
39
97
52
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
20
Williams Lake
5
97
23
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
99
6
19
97C
Kelowna
6
3A
Cranbrook
101
28
5
Nelson
3
33
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Map 5.31

Total Sheep Accidents (1983 - 1992)

Legend

1

2 - 3

4 - 5

6 - 10

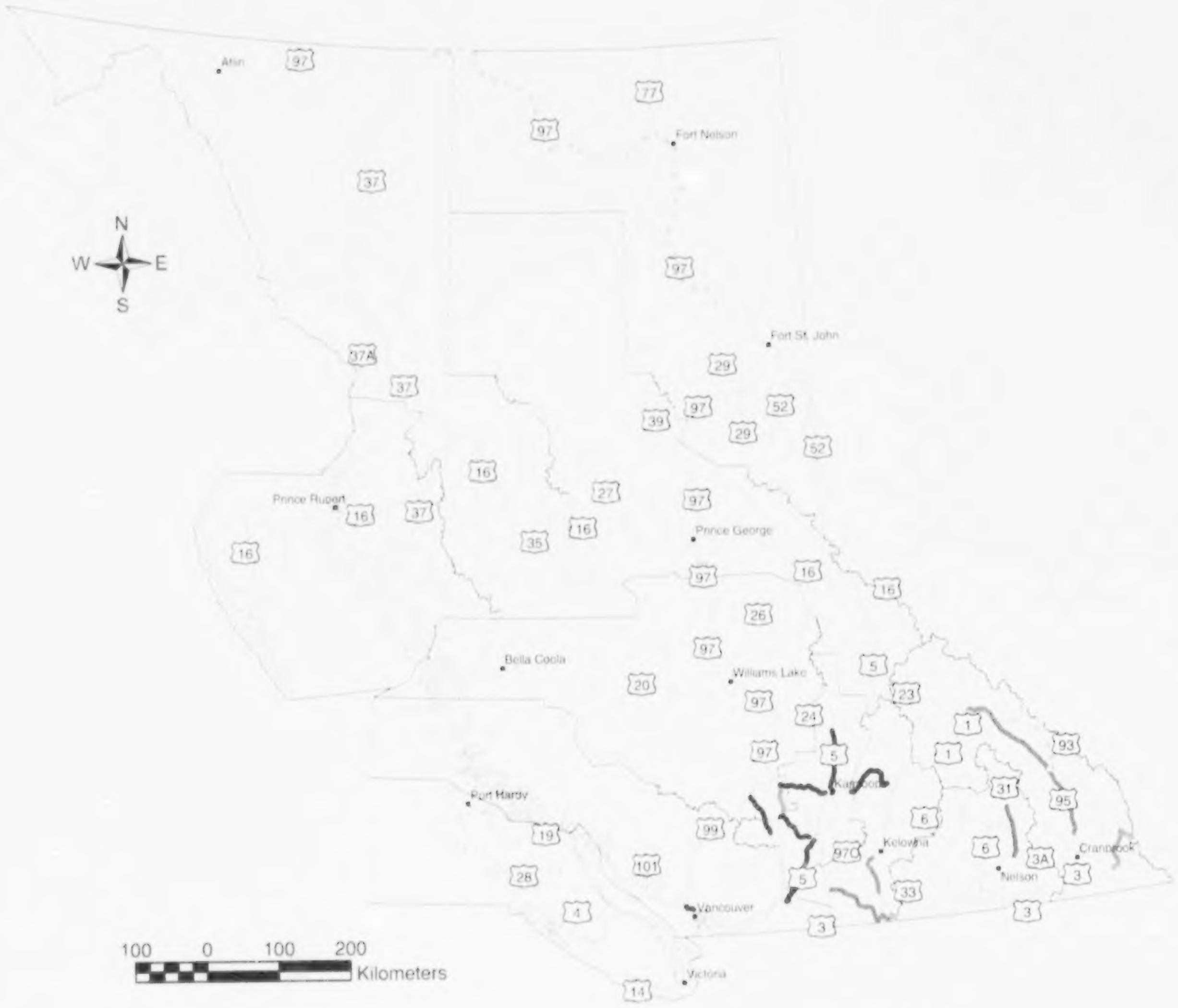
11 - 30

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location
and the normal range of the species may exist.

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation.
February 2004: maps produced by Ministry
of Sustainable Resource Management.



Atlin
Fort Nelson
Fort St. John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Port Hardy
Kamloops
Kelowna
Nelson
Cranbrook
Vancouver
Victoria
97
77
37
37A
29
39
52
16
27
35
26
20
5
23
24
1
93
31
95
6
3A
3
99
97C
33
19
28
101
4
14
N
W
E
S
100
0
100
200
Kilometers

Map 5.32

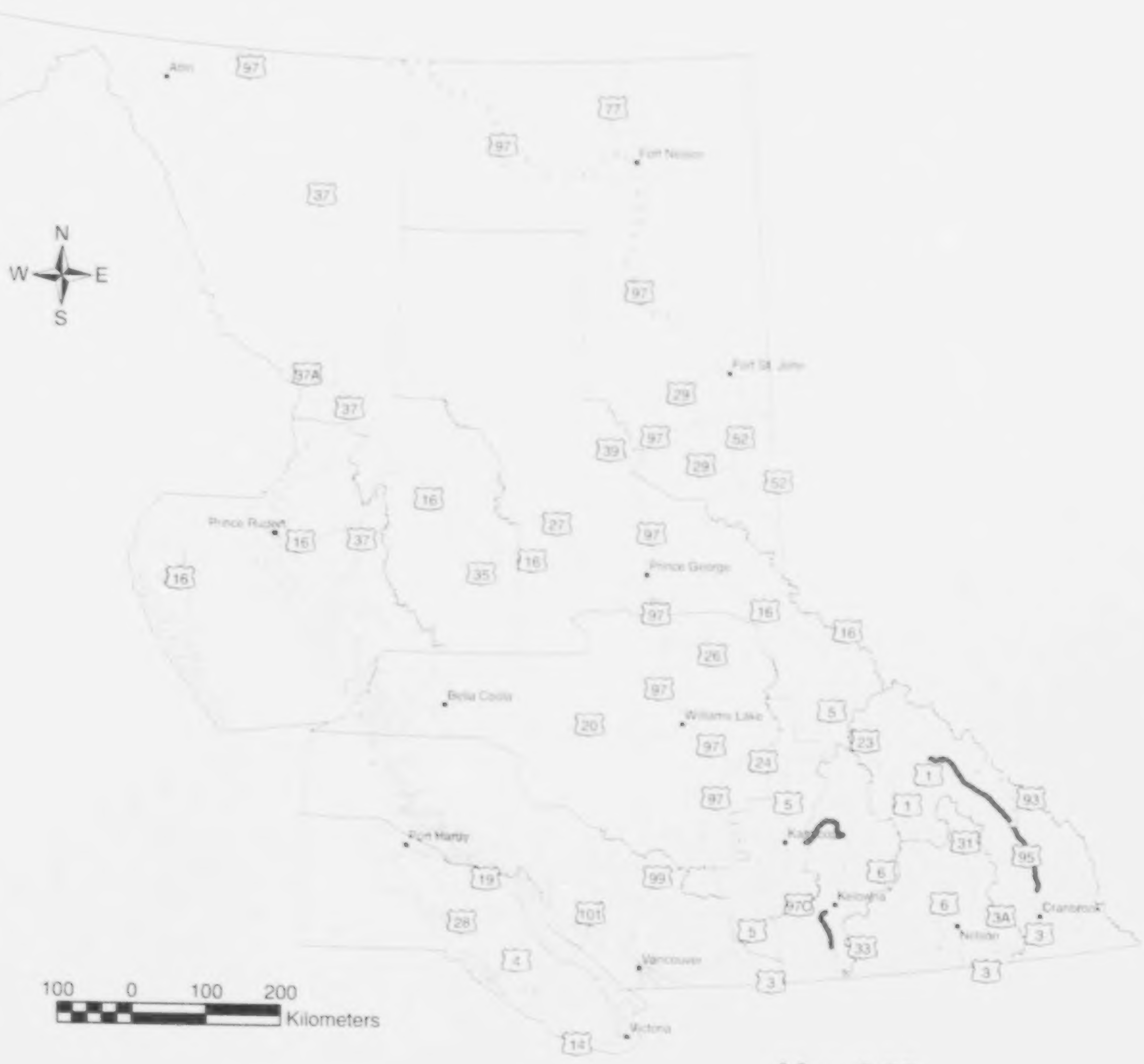
Total Sheep Accidents (1993 - 2002)

Legend

━ 1
━ 2 - 3
━ 4 - 5
━ 6 - 10
━ 11 - 30
No Accidents Reported on LKI Segment
- - - No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002 Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004, maps produced by Ministry
of Sustainable Resource Management


Atlin
97
77
97
Fort Nelson
37
N
W
E
S
97
Fort St. John
37A
37
29
39
97
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29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
Bella Coola
97
5
Williams Lake
20
23
97
24
1
97
5
1
93
Port Hardy
Kamloops
31
95
6
19
99
Kelowna
97C
6
3A
Cranbrook
28
101
5
33
Nelson
3
4
Vancouver
3
3
100
0
100
200
Kilometers
14
Victoria

Map 5.33

Sheep Accidents
per Kilometre per Year
(1983 - 1992)

Legend

- 0.001 - 0.005
- 0.006 - 0.010
- 0.011 - 0.020
- 0.021 - 0.040
- 0.041 - 0.070
- No Accidents Reported on LKI Segment
- No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002. Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation,
February 2004; maps produced by Ministry
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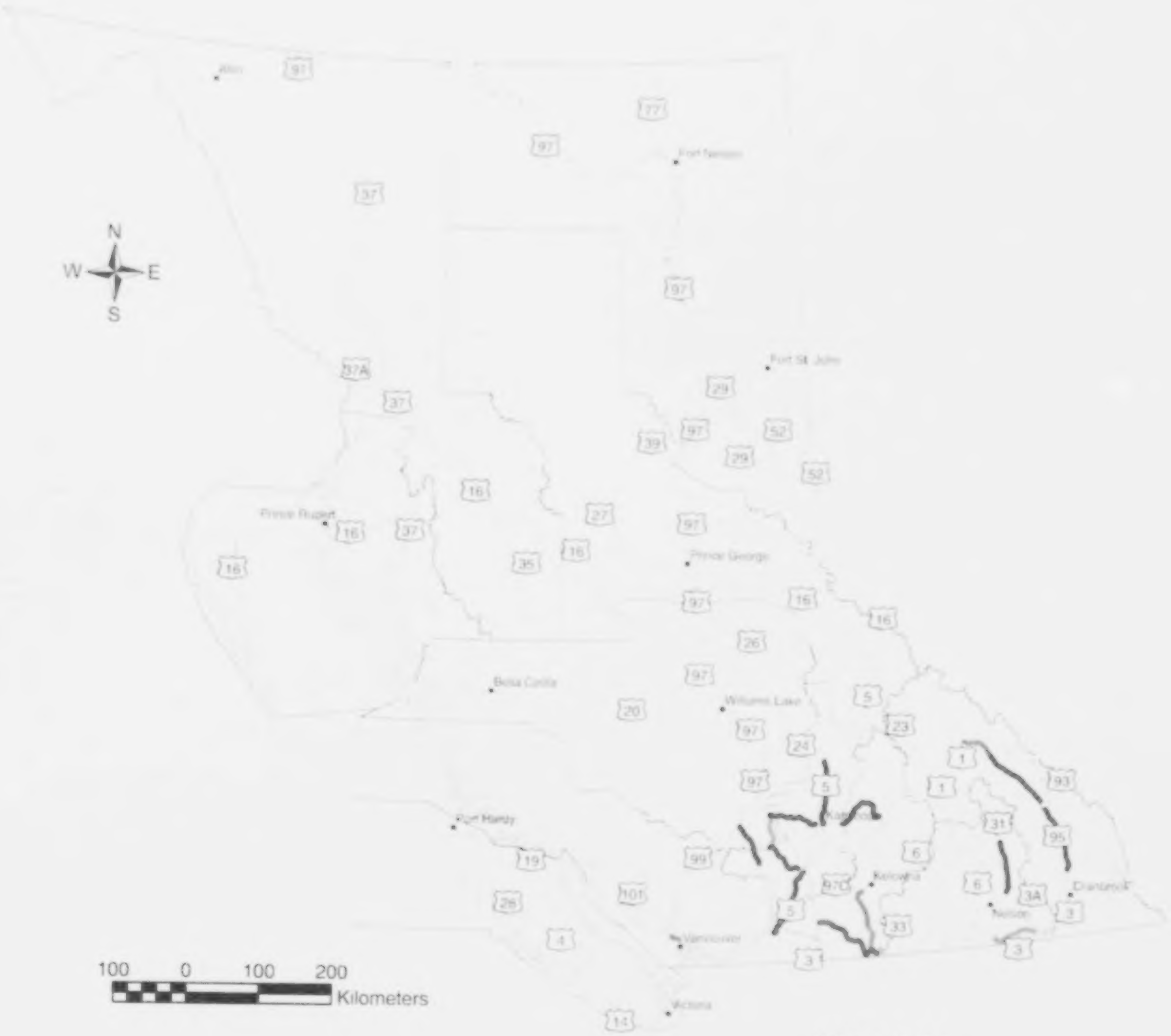
N
W
E
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Atlin
91
77
97
Fort Nelson
37
97
Fort St. John
37A
37
29
97
52
39
29
52
16
27
Prince Rupert
16
37
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
20
5
97
23
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
99
6
19
97C
Kelowna
6
3A
Cranbrook
101
28
5
Nelson
3
33
4
Vancouver
3
3
Victoria
14
100
0
100
200
Kilometers

Map 5.34

Sheep Accidents
per Kilometre per Year
(1993 - 2002)

Legend

— 0.001 - 0.005

— 0.006 - 0.010

— 0.011 - 0.020

— 0.021 - 0.040

— 0.041 - 0.070

No Accidents Reported on LKI Segment

No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004; maps produced by Ministry
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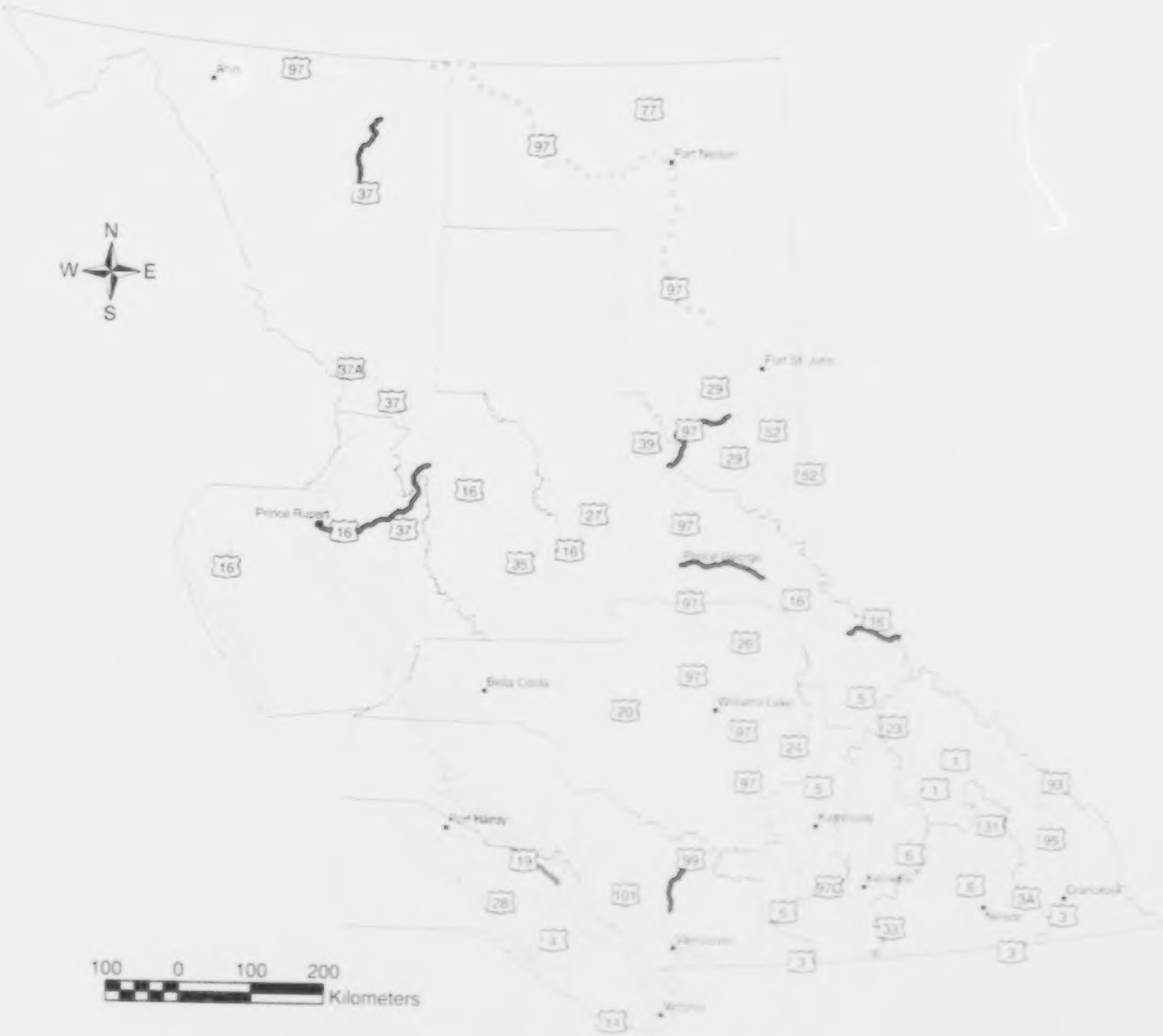
Atlin
Fort Nelson
Fort St. John
Prince Rupert
Prince George
Bella Coola
Williams Lake
Port Hardy
Kamloops
Kelowna
Vancouver
Victoria
Nelson
Cranbrook
N
E
S
W
100 0 100 200
Kilometers

Map 5.35

Total Wolf Accidents (1983 - 1992)

Legend

— 1
— 2
— 3
— 4
— 5 - 6
— No Accidents Reported on LKI Segment
- - - - No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002 Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
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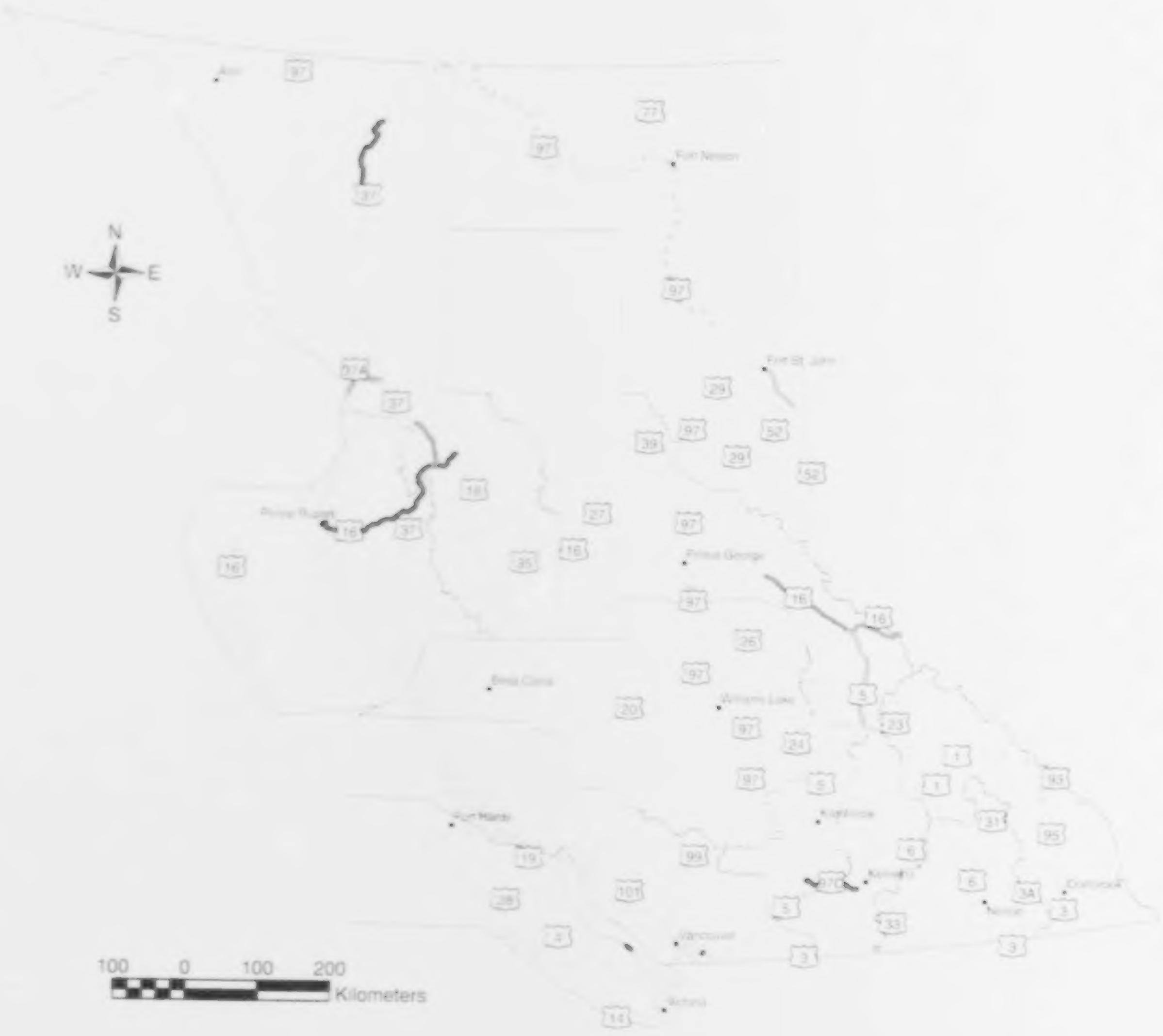

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Fort Nelson
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Fort St. John
97A
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29
97
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39
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
16
97
16
26
97
Bella Coola
20
Williams Lake
5
23
97
24
1
97
5
1
93
Kamloops
31
Port Hardy
95
19
99
6
97C
Kelowna
6
3A
Cranbrook
28
101
5
33
Nelson
3
4
Vancouver
3
3
Victoria
17
100
0
100
200
Kilometers

Map 5.36

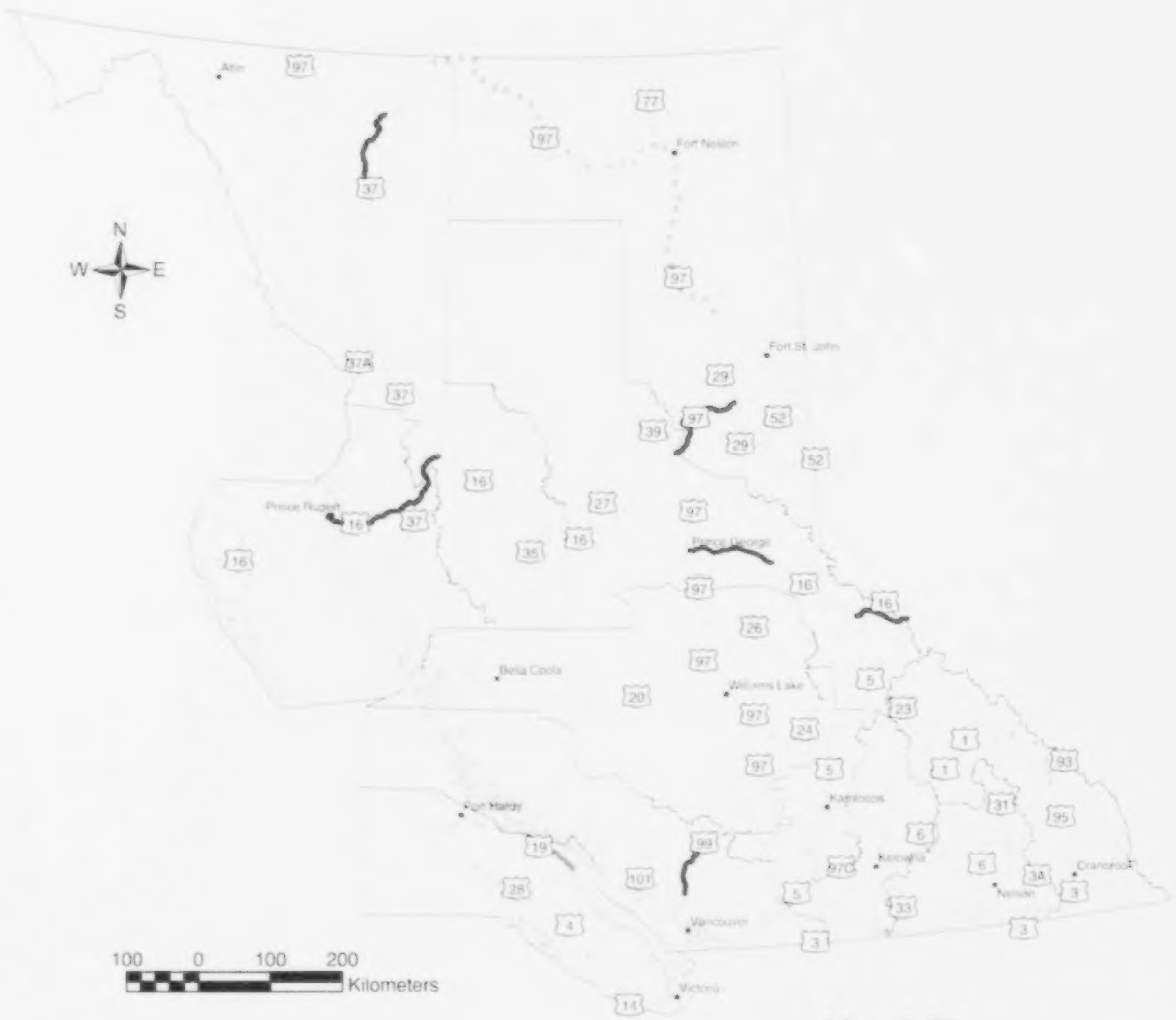
Total Wolf Accidents (1993 - 2002)

Legend

1
2
3
4
5 - 6
No Accidents Reported on LKI Segment
No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report;
British Columbia Ministry of Transportation
February 2004 maps produced by Ministry
of Sustainable Resource Management


Atlin
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Fort St. John
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16
Prince Rupert
16
37
27
97
16
35
16
Prince George
97
16
16
26
97
Bella Coola
Williams Lake
5
20
97
23
24
1
97
5
1
93
Kamloops
31
95
Port Hardy
19
99
6
97C
Kelowna
6
3A
Cranbrook
101
28
5
Nelson
3
4
33
3
Vancouver
3
100
0
100
200
Kilometers
Victoria
11

Map 5.37

Wolf Accidents
per Kilometre per Year
(1983 - 1992

Legend

▬ 0.001 - 0.002

▬ 0.003 - 0.005

▬ 0.006 - 0.010

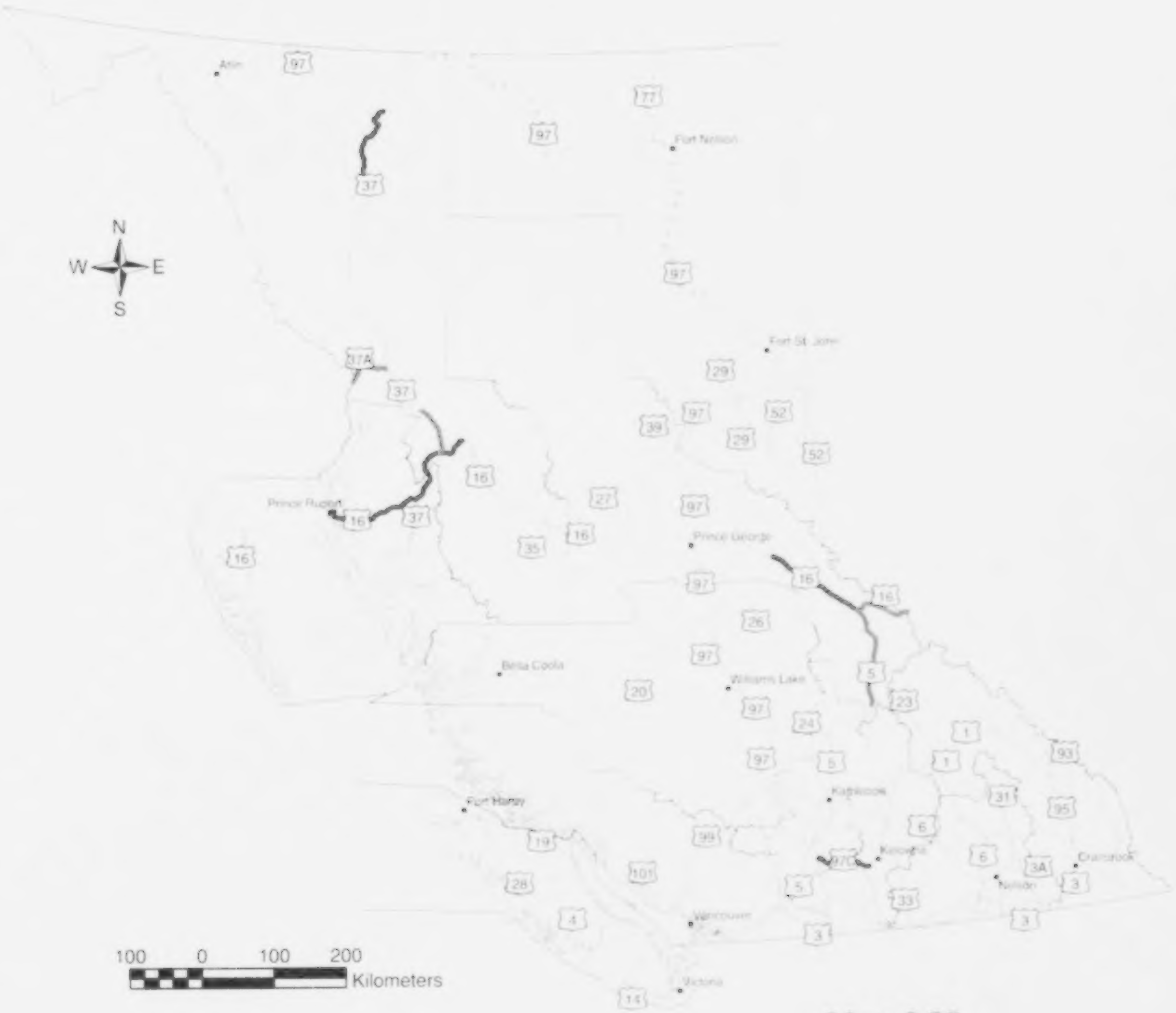
▬ 0.011 - 0.030

No Accidents Reported on LKI Segment

- - - No WARS Data (Federally-Maintained)

Notes
(1) Reported Species not verified by wildlife specialist.
(2) Discrepancies between the reported accident location and the normal range of the species may exist.

WARS 2002. Wildlife Accident Reporting System
2002 Annual Report.
British Columbia Ministry of Transportation,
February 2004; maps produced by Ministry
of Sustainable Resource Management.


N
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Fort Nelson
37
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Fort St. John
37A
37
29
97
52
39
29
52
16
Prince Rupert
16
37
27
97
16
35
16
Prince George
16
97
16
26
Bella Coola
97
5
Williams Lake
20
97
23
24
1
93
97
5
1
Kamloops
31
95
Port Hardy
6
19
99
97C
Kelowna
6
3A
Cranbrook
28
101
5
Nelson
3
33
4
Vancouver
3
3
Victoria
14
100
0
100
200
Kilometers

Map 5.38

Wolf Accidents
per Kilometre per Year
(1993 - 2002)

Legend

- 0.001 - 0.002
- 0.003 - 0.005
- 0.006 - 0.010
- 0.011 - 0.030
- No Accidents Reported on LKI Segment
- No WARS Data (Federally-Maintained)

Notes:
(1) Reported Species not verified by wildlife specialist
(2) Discrepancies between the reported accident location
and the normal range of the species may exist

WARS 2002: Wildlife Accident Reporting System
2002 Annual Report
British Columbia Ministry of Transportation
February 2004: maps produced by Ministry
of Sustainable Resource Management

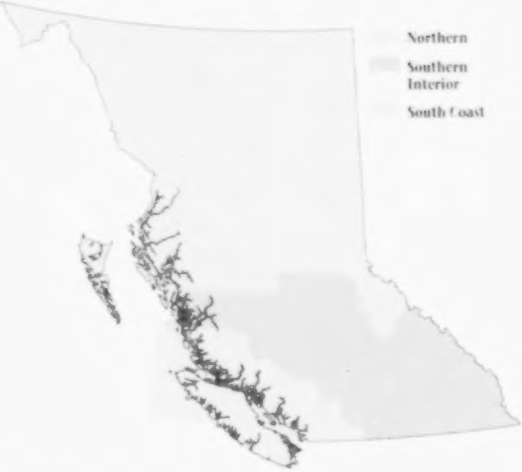
6.0 WILDLIFE ACCIDENTS BY REGION

6.1 Regional Comparisons

Regional Overviews

The British Columbia Ministry of Transportation divides its operational administration into three Regions, South Coast, Southern Interior, and Northern. Each Region represents a large geographic area with distinct bioclimatic conditions and diverse wildlife habitats.

Map 6.1



1. South Coast Region

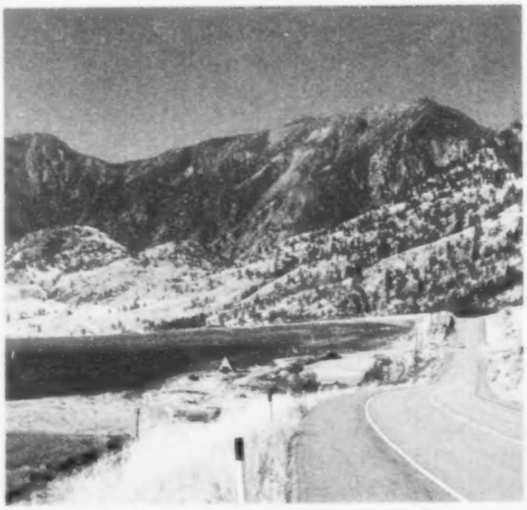
The South Coast Region is approximately 118,000 km^2 in size, the smallest Region in the Province. It is primarily coastal, encompassing Vancouver Island and the southern portion of the British Columbia coast. Its weather is characterized by plentiful rainfall with mild winters and mild summers. Along the Pacific west coast, humid coniferous rain forests occur (Valentine et al., 1978). The ecosystems in this Region are some of the most productive areas in the Province. Black-tailed deer habitat is abundant (British Columbia Ministry of Forests, 1999).

Sea-to-Sky Highway

(Photo: Gord Smith)

2. Southern Interior Region

The Southern Interior Region is approximately 545,500 km^2 in size, the second largest Region in the Province. It is located between the Coast Mountains and the Rocky Mountains. Being in the lee of the Coastal Mountains, this Region is characterized by drier climates. These valleys provide critical winter and spring forage for bighorn sheep and white-tailed deer (British Columbia Ministry of Forests, 1999). At lower elevations, the Interior Plateau has some of the driest and hottest valleys



Okanagan Valley

(Photo: Tourism BC)

in the Province. The Region has open woodlands and steppe grasslands. Grass and forest fires are not uncommon. At higher elevations, this Region has significant habitat for mule deer and elk. At the highest elevations, the mountains present severe and hostile environments for wildlife.

3. Northern Region

Monkman Falls

(Photo: Tourism BC)

The Northern Region is approximately 643,700 km^2 in size, the largest in the Province. It extends from the Pacific Ocean to the Peace River and the Alberta border, and from approximately the middle of the Province to the Yukon border. In the north, the climate is characterized by cold continental climate, with long, cold winters. The habitat is largely high latitude northern boreal forests, characteristic of Northern Canada and Euro-Siberia (Valentine et al., 1978). This Region provides extensive moose, caribou and elk habitat. In the east, moose are abundant in the Peace River area. At higher elevations, the essentially treeless alpine tundra provides critical habitat for caribou, mountain goats and mountain sheep (British Columbia Ministry of Forests, 1999).

6.2 Regional Wildlife Accident Comparisons

Given the size of the province and the dramatically different climatic and geographical regimes within each Region, variations between Regions may vary significantly. Table 6.1 provides a general breakdown of all wildlife accidents by Regions from 1983 to 2002. Although all Regions exhibit similar trends, the Provincial annual totals are heavily influenced by Region 2 where the largest number of wildlife accidents are reported. For the most part, the Provincial trend follows the trend observed for Region 2.

Warning sign

(Photo: Brent Persello)

In particular, the general pattern of wildlife accidents for the entire Province is greatly influenced by the number of deer-vehicle accidents recorded in Region 2. This Region has disproportionately more accidents than any other Region. Region 2 has some of the highest deer populations in the Province. This Region has areas with steep mountainous terrain transected by Highways 1, 3, 16 and 97.

When comparing 2002 wildlife-vehicle accidents by Region to those during previous years, it is important to note, the fluctuation between years can be considerable (Table 6.2).

When the monthly distribution of wildlife-vehicle accidents for all species in each Region for the period between 1993 and 2001 are compared, trends also appear. Collectively, the accident rate for all Regions peaks in May and November. Since deer represent approximately 80% of the animals killed, the patterns of accidents for other species is overshadowed by the pattern found for deer in all Regions.

For example, depending on weather patterns, Region 1 can experience a very wet winter but exhibit fewer wildlife accidents, while Regions 2 and 3 can experience heavy snowfalls with higher wildlife accidents as animals migrate from higher elevations to valleys where highways are located.

Figure 6.1 Total Annual Wildlife Accidents by Region (1983 to 2002)

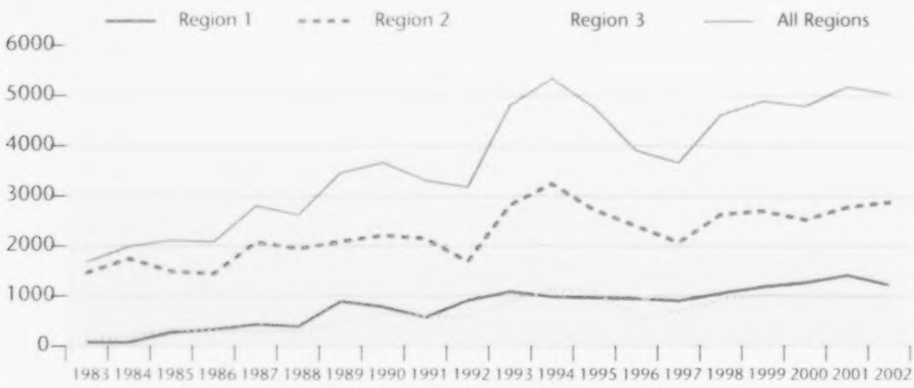
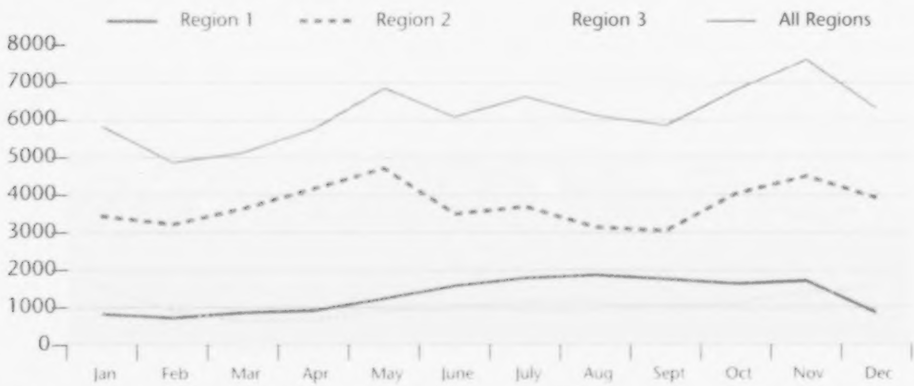


Figure 6.2 Total Monthly Wildlife Accidents by Region (1983 to 2002)



When the accident patterns for bear, deer, elk, and moose are examined, it is apparent the monthly accident distributions vary by species.

Table 6.1 Wildlife Accidents by Region (1983 to 2002)

YEAR	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Region 1	75	73	274	332	432	392	891	785	578	910	1,090	984	965	945	907	1,057	1,184	1,265	1,413	1,221	**15,773**
Region 2	1,461	1,741	1,489	1,441	2,071	1,940	2,083	2,207	2,147	1,683	2,810	3,237	2,716	2,393	2,067	2,626	2,694	2,520	2,772	2,871	**44,969**
Region 3	142	173	346	305	294	286	476	669	581	583	898	1,118	1,083	564	687	928	1,011	1,000	987	939	**13,070**
Totals	**1,678**	**1,987**	**2,109**	**2,078**	**2,797**	**2,618**	**3,450**	**3,661**	**3,306**	**3,176**	**4,798**	**5,339**	**4,764**	**3,902**	**3,661**	**4,611**	**4,889**	**4,785**	**5,172**	**5,031**	**73,812**

Table 6.2 Regional Wildlife Accidents (Fluctuations (1997 to 2002)

Region	1997	1998	% Change	1998	1999	% Change	1999	2000	% Change	2000	2001	% Change	2001	2002	% Change
1	907	1,057	16.5	1,057	1,184	12	1,184	1,265	6.8	1,265	1,413	11.7	1,413	1,221	-13.6
2	2,067	2,626	27	2,626	2,694	2.6	2,694	2,520	-6.5	2,520	2,772	10	2,772	2,871	3.6
3	687	928	35.1	928	1,011	8.9	1,011	1,000	-1.1	1,000	987	-1.3	987	939	-4.9
Total	**3,661**	**4,611**	**25.9**	**4,611**	**4,889**	**6**	**4,889**	**4,785**	**-2.1**	**4,785**	**5,172**	**8.1**	**5,172**	**5,031**	**-2.7**

Table 6.3 Wildlife Accidents in Region 1 (1983 to 2002)

Region 1	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	1	1	11	14	4	4	14	10	8	13	24	18	16	33	16	20	29	16	24	26	302
Beaver	0	1	1	0	0	0	4	0	1	0	2	6	5	0	2	2	3	9	13	10	59
Bobcat	0	0	0	0	1	1	0	2	0	0	1	1	4	1	0	0	2	0	2	2	17
Caribou	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3
Cougar	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	4	1	3	1	13
Coyote	0	0	10	11	6	6	28	24	7	66	59	61	49	42	35	55	26	40	44	50	619
Deer	74	68	248	298	392	356	840	743	554	817	992	850	875	820	821	932	1,045	1,098	1,174	954	13,951
Elk	0	1	0	1	0	0	1	3	2	6	2	5	1	4	0	1	9	16	5	4	61
Fox	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2	1	1	0	6	0	12
Moose	0	0	0	0	0	0	1	0	0	1	2	3	0	1	2	5	3	2	5	5	30
Porcupine	0	0	1	1	0	0	1	0	0	3	2	1	3	1	1	1	0	0	1	0	16
Possum	0	0	0	0	0	0	0	0	0	0	0	25	5	3	0	0	0	0	1	4	38
Raccoon	0	0	0	5	28	25	1	1	6	2	5	8	3	36	22	34	44	43	94	103	460
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Skunk	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5	7	14
Wolf	0	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
Other	0	0	2	2	0	0	1	2	0	0	0	3	4	3	3	6	18	39	36	54	173
Totals	75	73	274	332	432	392	891	785	578	910	1,090	984	965	945	907	1,057	1,184	1,265	1,413	1,221	15,773

Table 6.4 Wildlife Accidents in Region 2 (1983 to 2002)

Region 2	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	8
Bear	18	17	24	36	25	22	29	23	31	36	57	54	54	54	54	80	94	44	62	107	921
Beaver	0	1	3	2	2	6	4	10	1	4	9	1	3	5	4	0	3	5	3	10	76
Bobcat	0	0	0	1	1	0	1	0	6	6	3	0	1	4	0	1	0	4	1	0	29
Caribou	0	0	0	0	0	0	0	0	1	1	0	4	4	3	1	3	0	0	0	2	19
Cougar	0	0	0	0	0	0	0	0	0	1	0	2	1	3	2	0	0	1	2	2	14
Coyote	6	12	8	15	22	28	28	44	36	35	79	50	59	50	40	59	42	41	46	49	749
Deer	929	1,177	957	1,067	1,229	1,749	1,875	1,966	1,917	1,495	2,472	2,888	2,436	2,053	1,816	2,269	2,318	2,153	2,345	2,361	37,472
Elk	56	73	45	50	71	77	62	68	54	48	69	109	76	95	62	86	109	133	146	165	1,654
Fox	0	0	3	0	1	0	1	3	2	0	3	3	0	1	3	2	5	5	7	3	42
Moose	23	37	39	27	32	40	46	45	55	29	60	80	51	98	72	89	83	70	94	76	1,146
Porcupine	0	0	6	10	21	6	9	33	38	18	33	17	11	7	3	6	4	4	1	0	227
Raccoon	0	0	0	0	0	0	3	0	1	1	3	0	2	8	0	2	2	7	6	4	39
Sheep	1	3	3	4	5	7	7	8	5	8	14	22	10	10	6	13	9	15	8	5	163
Skunk	0	0	0	1	0	0	0	1	0	1	6	4	7	2	1	1	0	9	13	10	56
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
Other	428	421	399	228	662	5	18	6	0	0	2	2	1	0	3	14	23	27	37	76	2,352
Totals	1,461	1,741	1,489	1,441	2,071	1,940	2,083	2,207	2,147	1,683	2,810	3,237	2,716	2,393	2,067	2,626	2,694	2,520	2,772	2,871	44,969

Table 6.5 Wildlife Accidents in Region 3 (1983 to 2002)

Region 3	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	8	7	6	17	15	9	18	17	18	24	31	37	38	26	24	42	43	42	49	36	507
Beaver	0	0	18	1	6	3	3	4	2	0	0	2	5	2	12	7	3	6	7	3	84
Bobcat	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	4
Caribou	0	0	0	0	0	0	0	1	5	5	0	3	5	1	0	0	0	3	3	2	28
Cougar	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Coyote	0	0	0	0	0	1	3	8	5	18	27	23	21	12	15	21	21	24	14	11	224
Deer	25	36	58	78	111	131	232	241	274	273	528	637	606	301	369	512	536	589	509	543	6,589
Elk	0	0	1	2	1	1	3	3	3	9	4	6	16	5	16	16	11	18	8	10	133
Fox	0	0	0	3	3	1	3	0	6	0	1	1	3	4	1	2	6	9	12	3	58
Moose	105	130	102	150	111	112	152	190	128	166	209	322	316	185	181	270	325	251	293	270	3,968
Porcupine	1	0	158	52	46	26	58	200	136	87	88	85	62	25	66	54	55	46	44	43	1,332
Raccoon	0	0	2	0	0	1	2	0	0	0	2	0	0	0	0	0	0	1	21	1	30
Skunk	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Wolf	1	0	0	0	1	1	1	1	2	1	2	1	5	2	2	1	3	0	8	3	35
Other	2	0	1	2	0	0	1	4	1	0	2	0	5	1	1	3	8	11	19	14	75
Totals	142	173	346	305	294	286	476	669	581	583	898	1,118	1,083	564	687	928	1,011	1,000	987	939	13,070

Figure 6.3 Region 1 - Major Species Accident Comparisons (1983 to 2002)

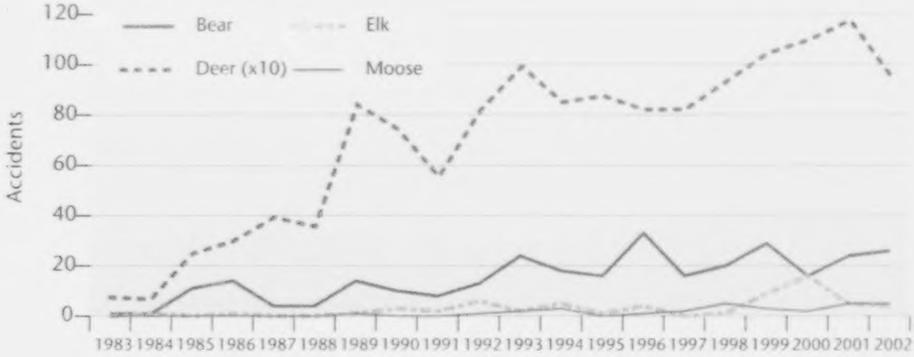


Figure 6.4 Region 2 - Major Species Accident Comparisons (1983 to 2002)

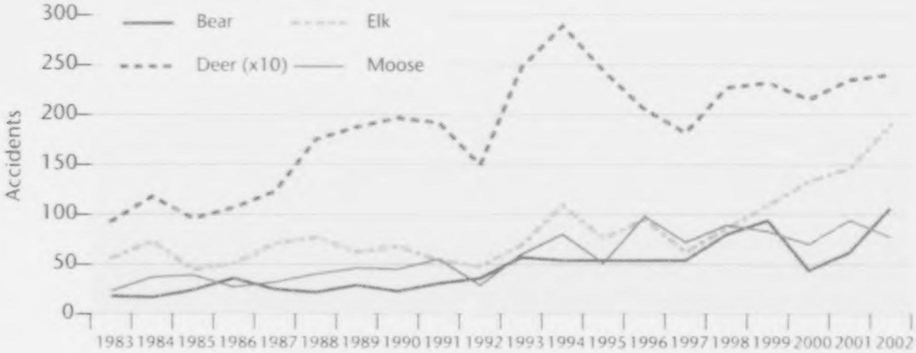
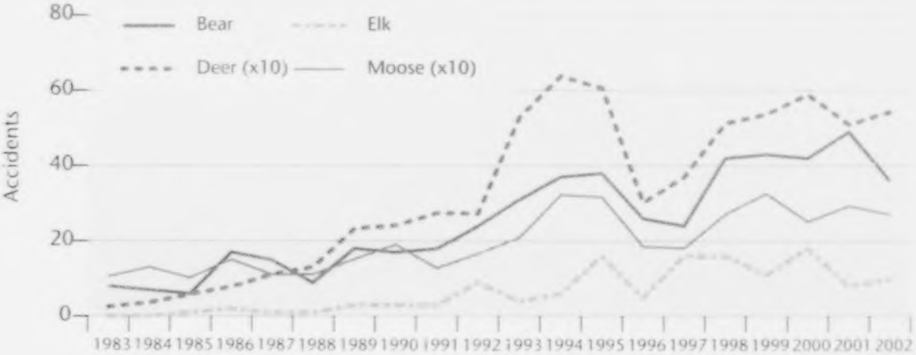


Figure 6.5 Region 3 - Major Species Accident Comparisons (1983 to 2002)



6.3 BEARS

Grizzly

(Photo: W. Paris)

Black Bear

(Photo: Tourism BC)

Bear-related motor vehicle accidents have been generally increasing over the last 20 years. The greatest fluctuations in accident numbers has been in Region 2, where the greatest potential for bear-motor vehicle interaction exists. The pattern of bear accidents between 1993 and 2002 appears similar in all three Regions. In Regions 2 and 3, bear-related motor vehicle accidents occur more frequently in September. This peak coincides with the end of summer and the depletion of the bears' natural food sources in more remote locations. At this time, bears appear to migrate toward food sources located near human settlements. Consequently, the number of bear-motor vehicle accidents increases at the same time bear-human conflicts also increase. The peak in bear-related accidents occurs a month later, in October, in Region 1. This is a reflection of the later onset of fall and winter in the southwestern corner of the Province. Although common belief suggests all bears hibernate uninterrupted during the winter months, WARS data shows a small number of bears are killed between November and March. On warmer winter days, some larger male bears awake from hibernation and roam about. (Austin, 1999)

Figure 6.6 Regional Comparisons – Total Annual Bear Accidents (1983 to 2002)

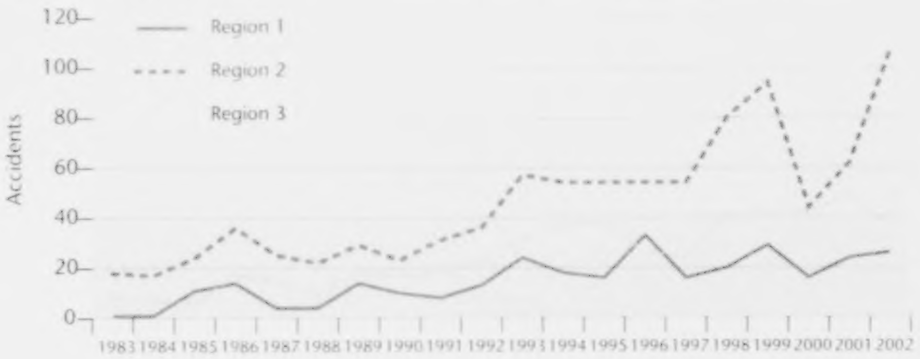


Figure 6.7

Region 1: Total Monthly Bear Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

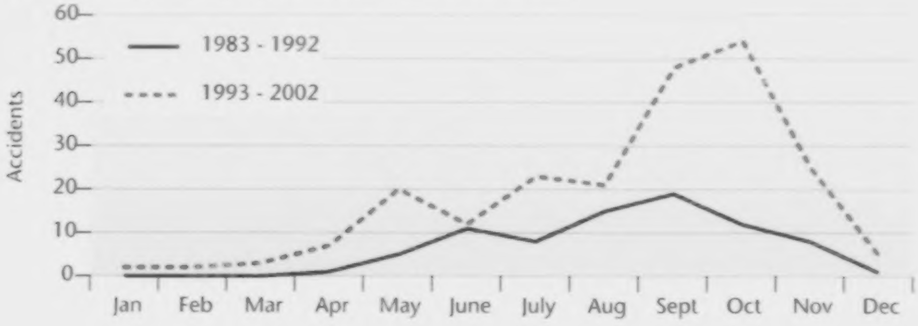


Figure 6.8

Region 2: Total Monthly Bear Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

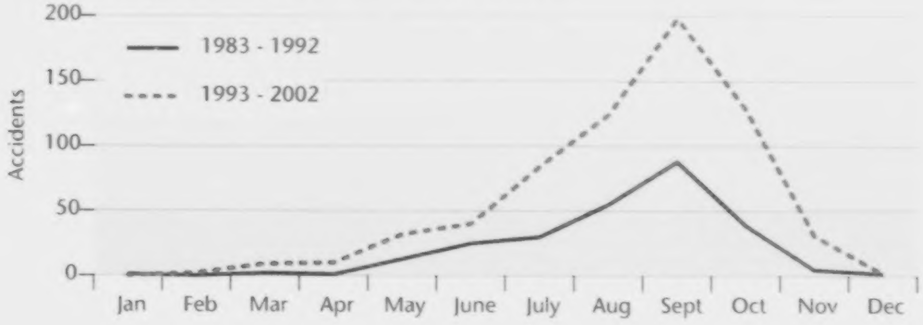


Figure 6.9

Region 3: Total Monthly Bear Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

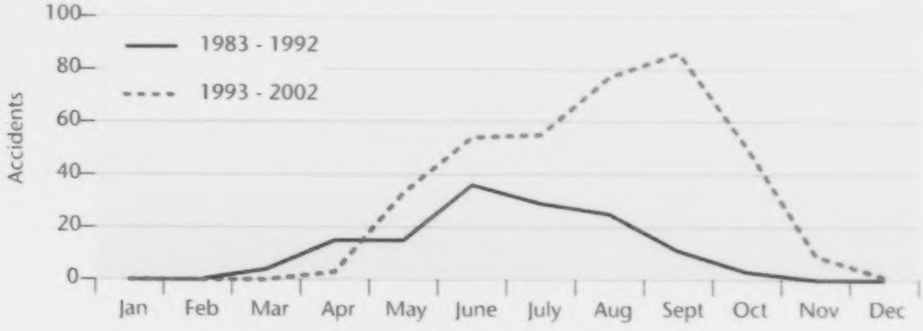


Figure 6.10

Region 1: Total Monthly Bear Accidents by Sex (1983 to 2002)

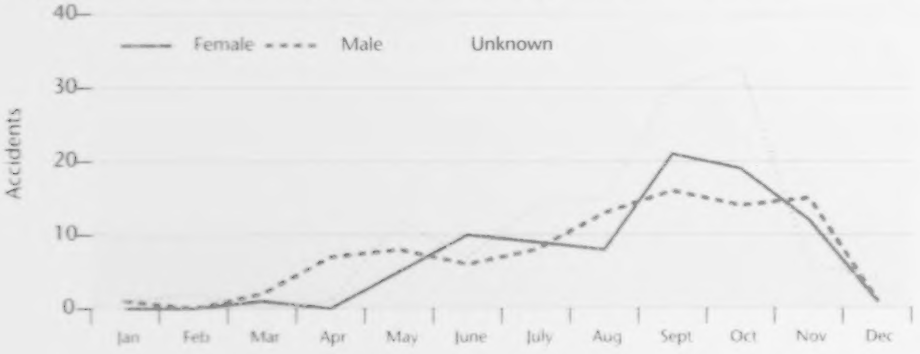


Figure 6.11

Region 2: Total Monthly Bear Accidents by Sex (1983 to 2002)

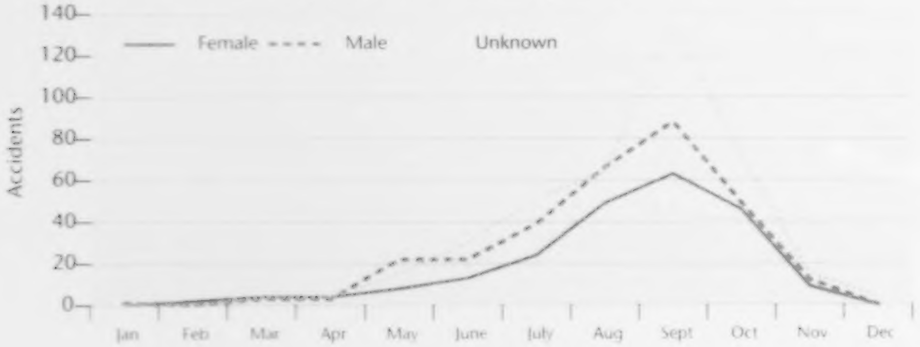
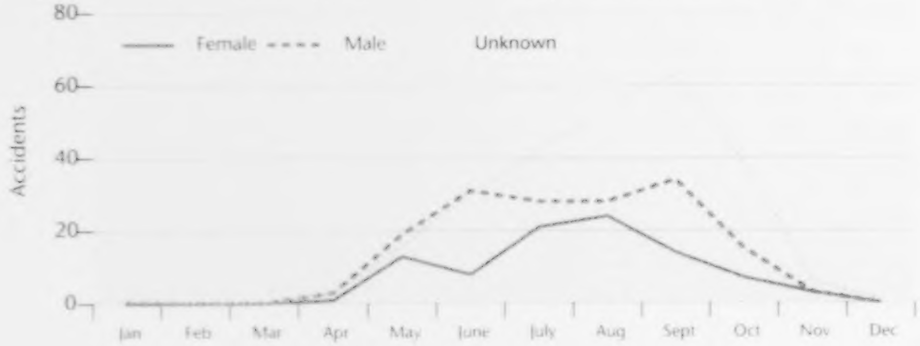


Figure 6.12

Region 3: Total Monthly Bear Accidents by Sex (1983 to 2002)



6.4 DEER

The general trend shows an increase in the number of accidents over the last 20 years. Although the magnitude of deer accidents in Region 2 is significantly greater that those found in the other Regions, Regions 2 and exhibit relatively similar patterns. Region 1, with its milder climate, and fewer migratory herds, has more deer-related accidents in the summer months. In Regions 2 and 3, deer are more inclined to move to higher ground, further from highways located in valley bottoms, to feed during the summer months.

When comparing monthly deer accident rates over the last two decades, it appears the number of November accidents in all Regions has been increasing in the period between 1993 and 2002.

Deer in spring (Photo: BC Parks)

Deer in winter (Photo: BC Parks)

Figure 6.13 Regional Comparisons – Total Annual Deer Accidents (1983 to 2002)

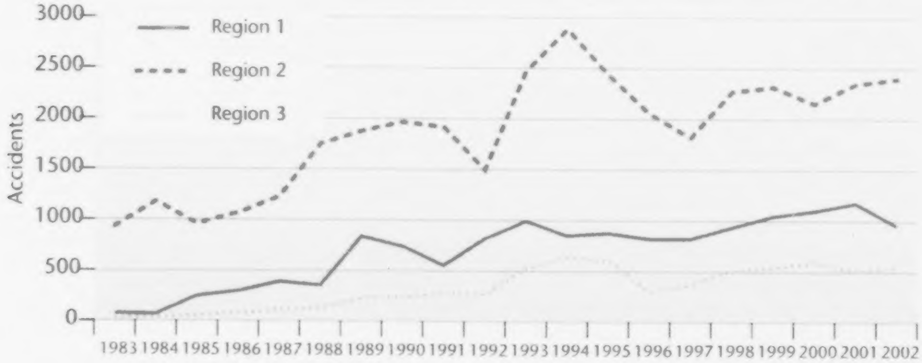


Figure 6.14

Region 1: Total Monthly Deer Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

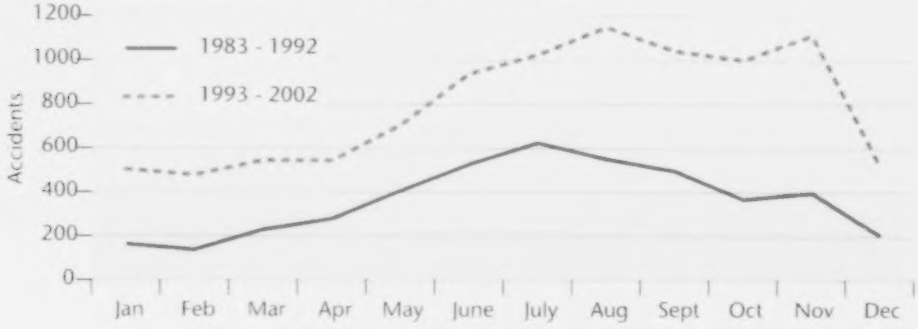


Figure 6.15

Region 2: Total Monthly Deer Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

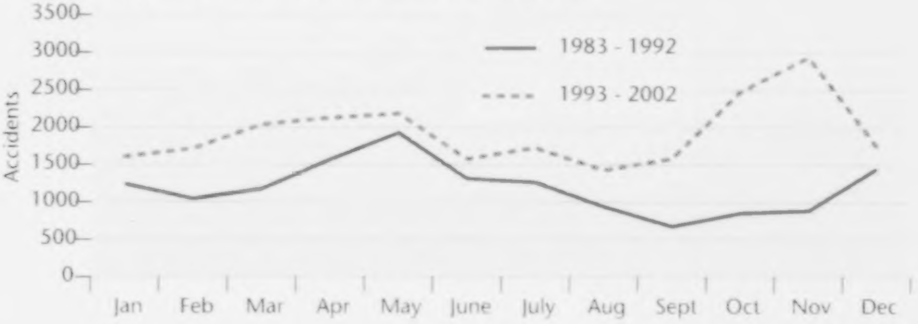


Figure 6.16

Region 3: Total Monthly Deer Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

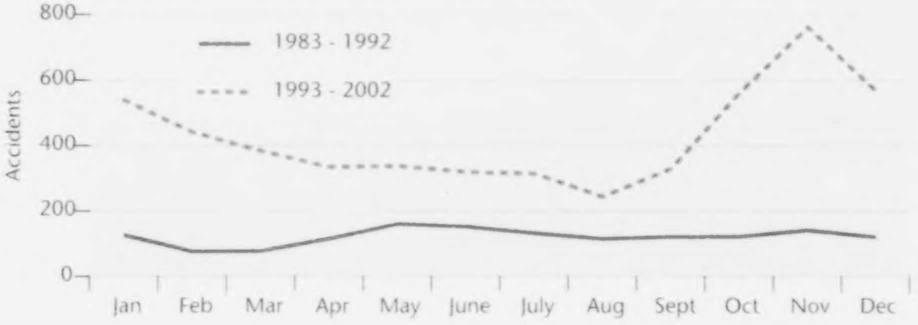


Figure 6.17

Region 1: Total Monthly Deer Accidents by Sex (1983 to 2002)

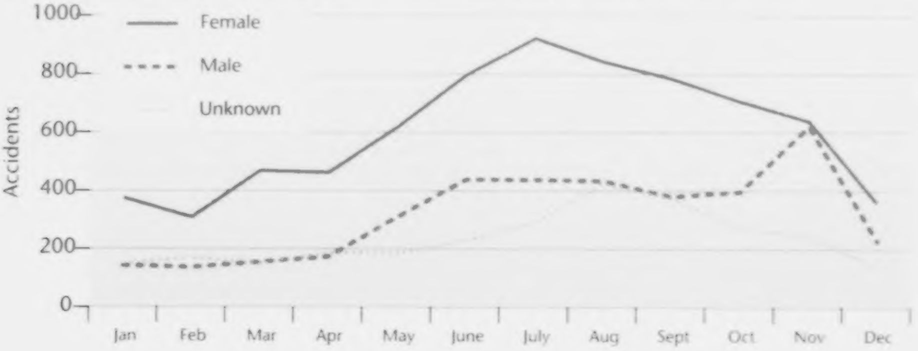


Figure 6.18

Region 2: Total Monthly Deer Accidents by Sex (1983 to 2002)

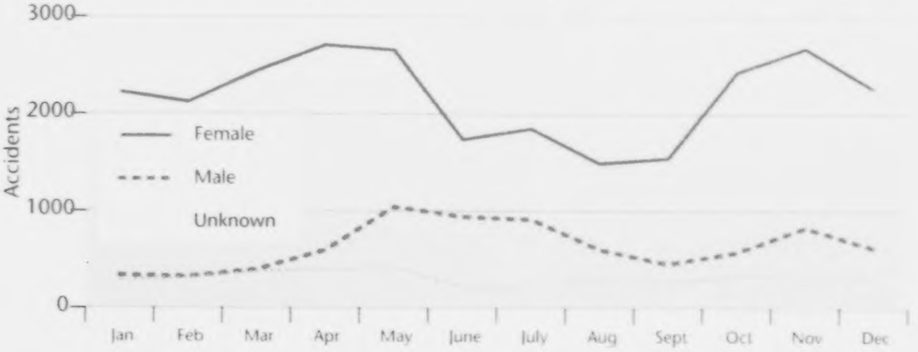
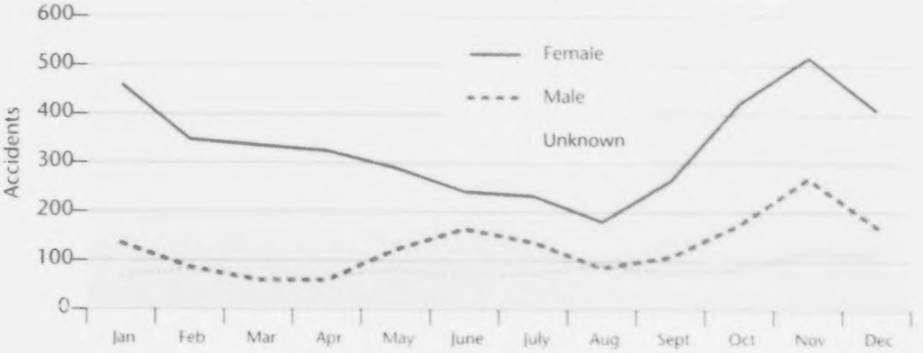


Figure 6.19

Region 3: Total Monthly Deer Accidents by Sex (1983 to 2002)



6.5 ELK

The patterns of elk-related motor vehicle accidents in the three Regions have been relatively consistent in each Region over the last 20 years. The number of accidents has increased between 1993 and 2002. In Regions 1, the greatest number of accidents occurs in May and June, followed by a smaller peak in October. Region 2 has the greatest number of elk-related motor vehicle accidents. As a result, the monthly pattern for Region 2 is more well established, and has been consistent over the last two decades. While both Regions 2 and 3 have the greatest number of accidents in the winter, between October and February, Region 3 has a secondary peak in May and June.

Solitary Elk (Photo: R. Parry)

Elk herd (Photo: R. Parry)

In to the other large ungulates, primarily deer and moose, significantly fewer elk are reported found on Provincial highways. As a consequence, the pattern of elk-related motor vehicle accidents is less established. The winter peak appears to coincide with times of high snowfall in the Regions, when elk are found alongside highways that are actively kept cleared of snow. Elk appear to be influenced by the same snow conditions which affect moose.

Figure 6.20 Regional Comparisons – Total Annual Elk Accidents (1983 to 2002)

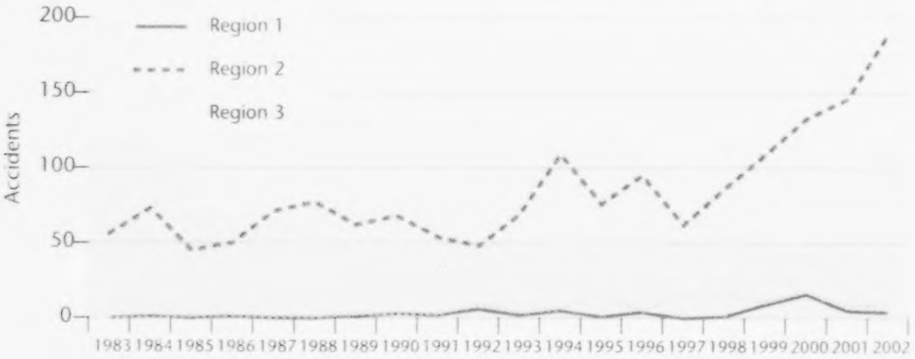


Figure 6.21

Region 1: Total Monthly Elk Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

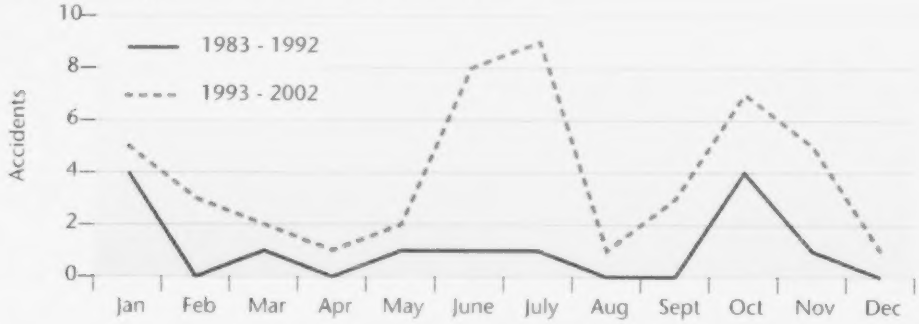


Figure 6.22

Region 2: Total Monthly Elk Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

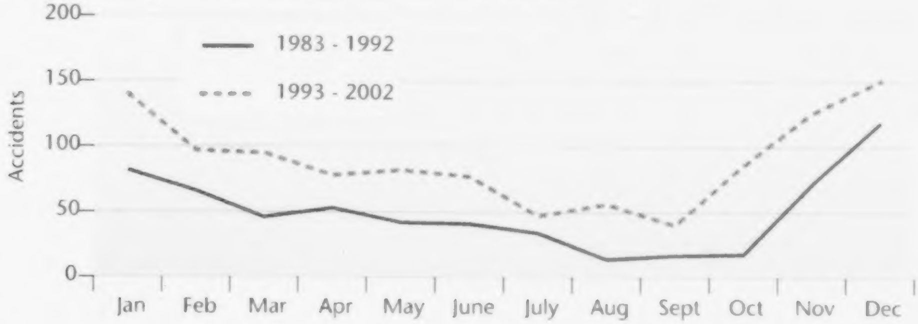


Figure 6.23

Region 3: Total Monthly Elk Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

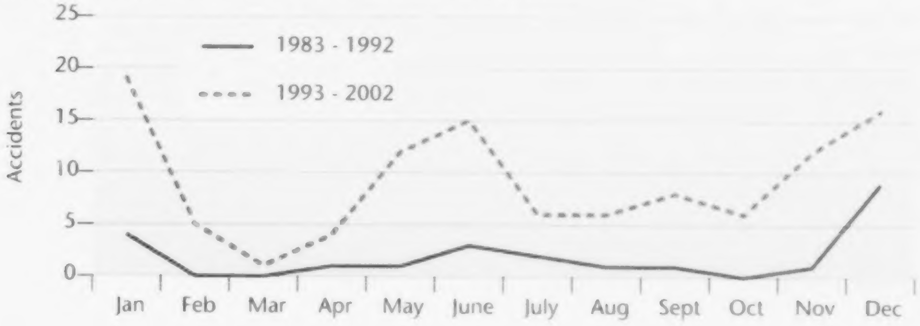


Figure 6.24

Region 1: Total Monthly Elk Accidents by Sex (1983 to 2002)

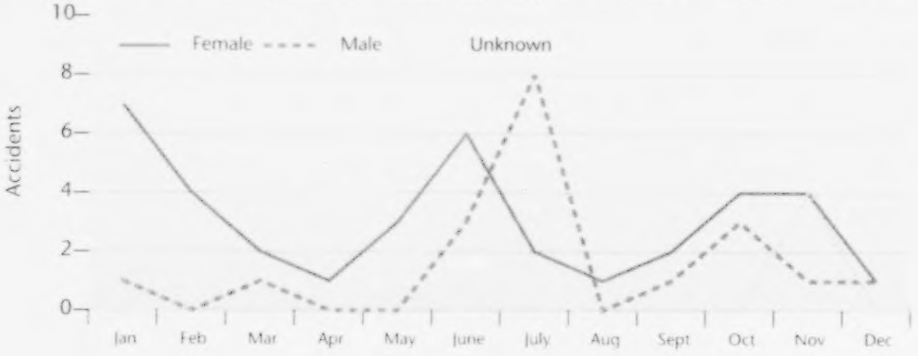


Figure 6.25

Region 2: Total Monthly Elk Accidents by Sex (1983 to 2002)

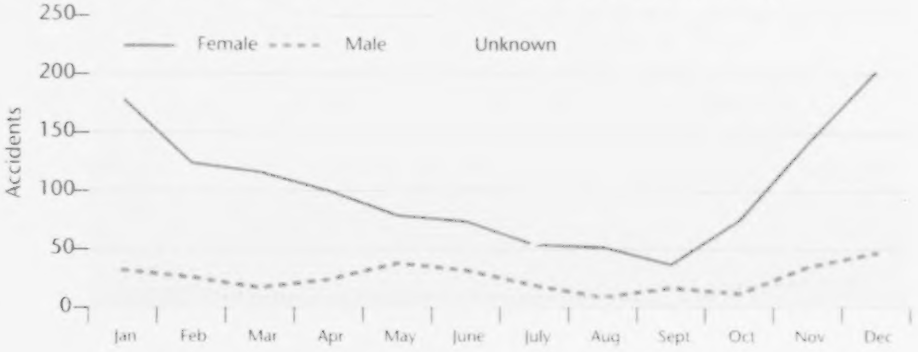
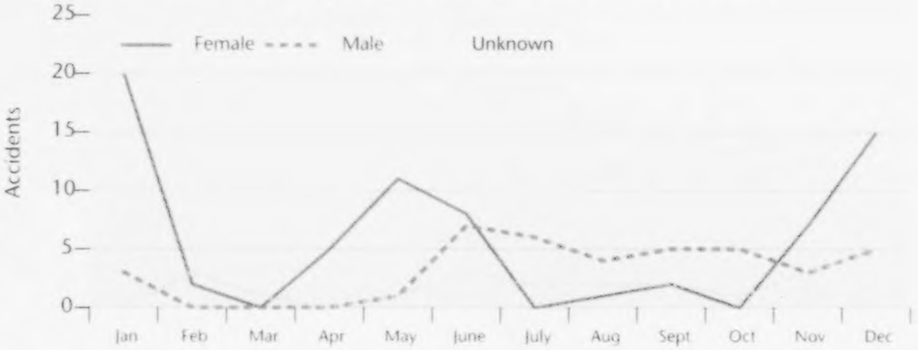


Figure 6.26

Region 3: Total Monthly Elk Accidents by Sex (1983 to 2002)



6.6 MOOSE

Moose

(Photo: BC Parks)

The number of moose-related motor vehicle in Region 1 has been relatively low over the last twenty years. There has been a gradual increase in the number of these accidents in Region 2. The greatest number of accidents, and the most dramatic increase in the number of accidents has occurred in Region 3. This increase has not been a steady one, as great fluctuations in the numbers of accidents appears to occur every 3 to 4 years. In both Region 2 and Region 3, the fluctuation can be as much as 90% in a single two year period. The causes of such dramatic fluctuation require further study.

Pair of Moose on highway

(Photo: Richard Ross, Sr.)

Given the low number of moose-related accidents in Region 1, the pattern appears sporadic. In Regions 2 and 3, the accident patterns are far more defined, as considerably more accidents have been recorded in these Regions. For the most part, both Regions experience accident peaks in the summer (June and July) and in the winter (November, December and January). The summer peak may be due to pregnant cows moving to calving grounds in the early summer or licking salt on or along the highway. The winter peak appears to coincide with times of high snowfall in the Regions, when moose are found alongside highways that are actively kept cleared of snow.

Figure 6.27 Regional Comparisons – Total Annual Moose Accidents (1983 to 2002)

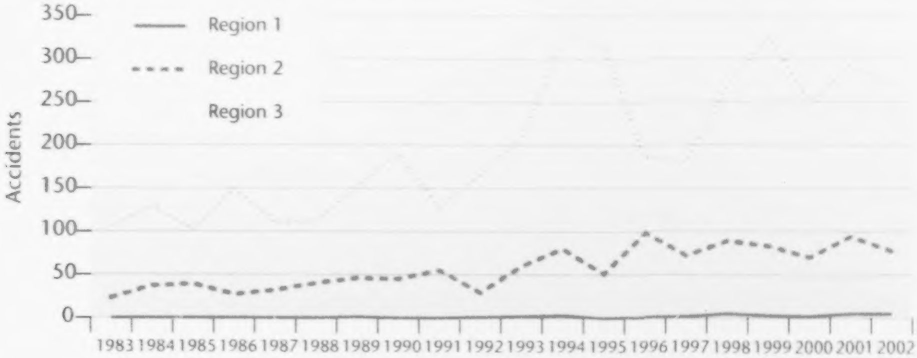


Figure 6.28

Region 1: Total Monthly Moose Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

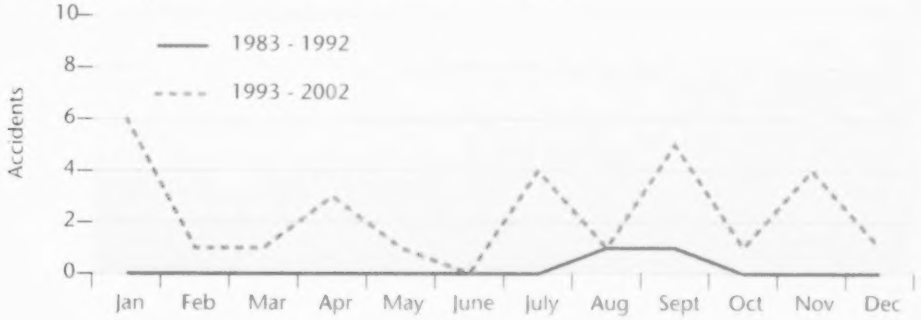


Figure 6.29

Region 2: Total Monthly Moose Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

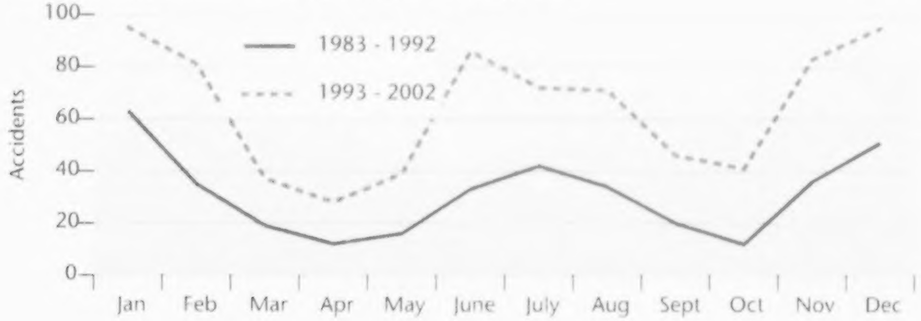


Figure 6.30

Region 3: Total Monthly Moose Accidents (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

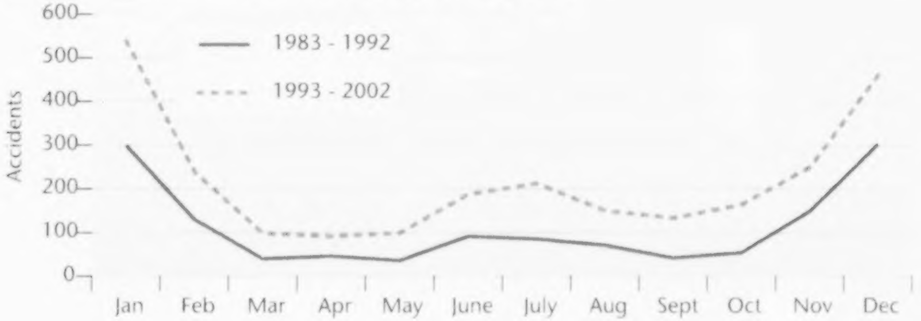


Figure 6.31

Region 1: Total Monthly Moose Accidents by Sex (1983 to 2002)

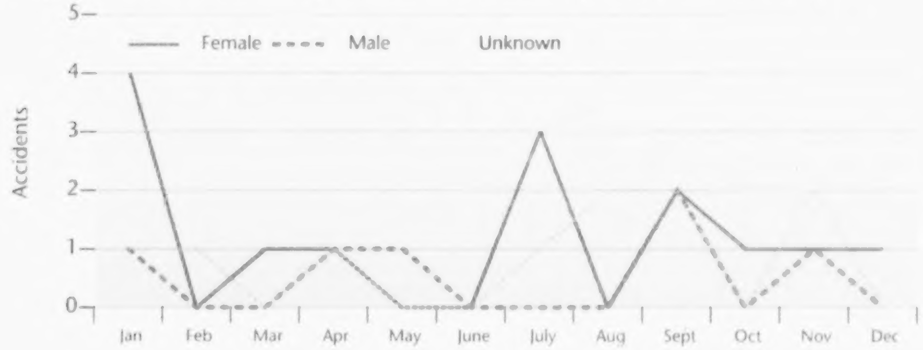


Figure 6.32

Region 2: Total Monthly Moose Accidents by Sex (1983 to 2002)

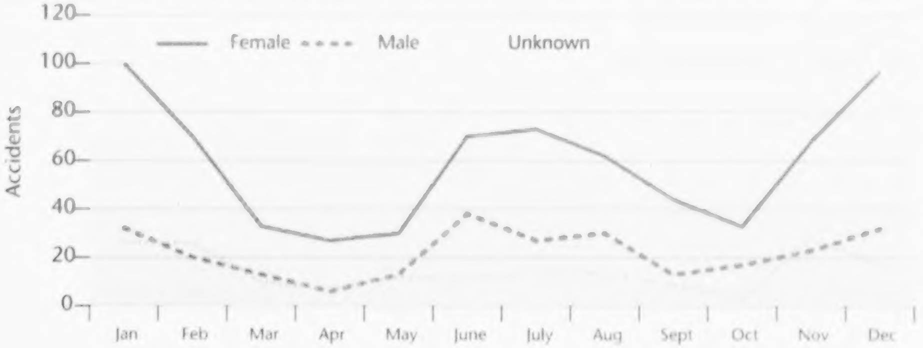
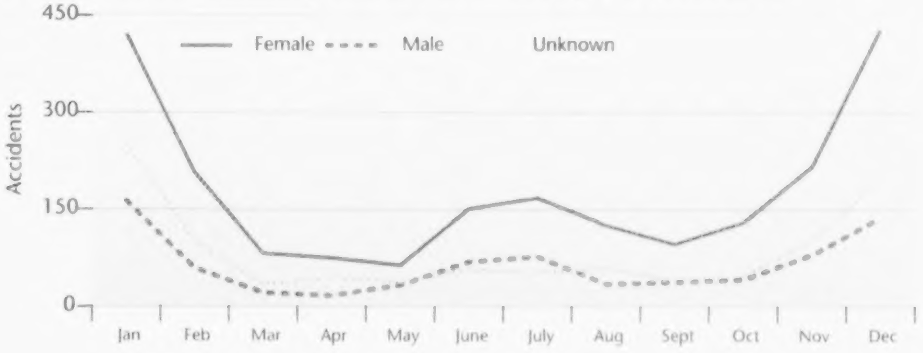


Figure 6.33

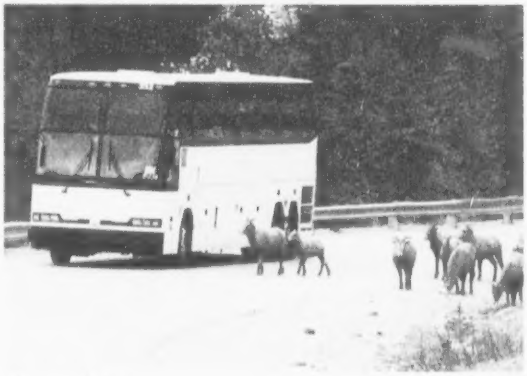
Region 3: Total Monthly Moose Accidents by Sex (1983 to 2002)



6.7 SHEEP

Sheep accidents primarily occur in Region 2. Except for a single sheep reported found in Region 1 in August of 2002, all sheep accidents reports have been located in Region 2. While most sheep accidents occur between November and February, intermittent peaks occur in April, June and September. In late winter, as snow levels at higher elevations increase, sheep migrate to valley bottoms where highways are typically located. In early summer, sheep begin moving out of the valleys, feeding near highways, on their way to higher elevations for lambing. In late summer, they begin moving back in preparation for the rutting season, which usually occurs in October or November.

Sheep (Photo: Tourism BC)



Sheep and bus (Photo: Alan Dibb)

Figure 6.34 Regional Comparisons – Total Annual Sheep Accidents (1983 to 2002)

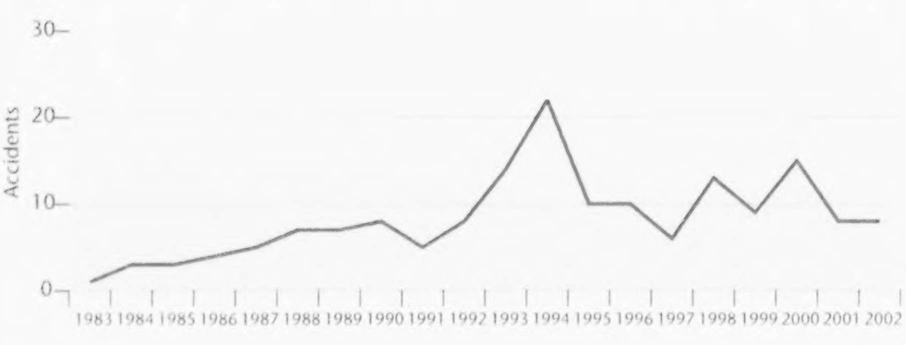
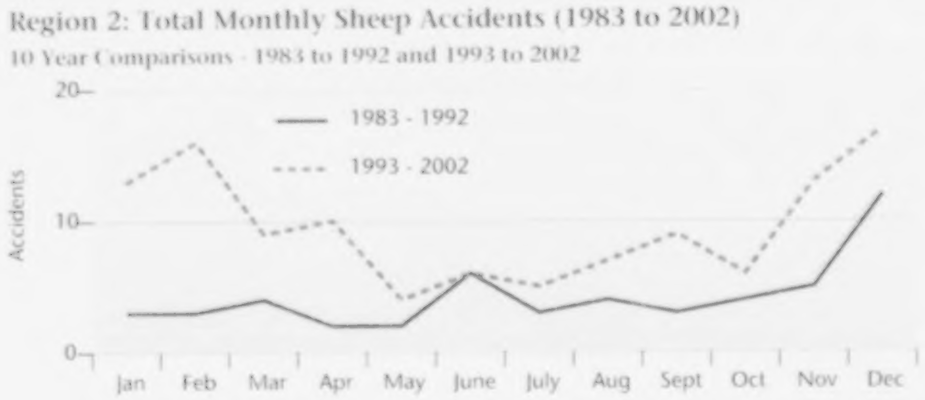


Figure 6.35 – Region 2: Total Monthly Sheep Accidents



6.8 COYOTE

Coyote (Photo: W. Scott Cook)

Coyote (Photo: W. Scott Cook)

For all three Regions, a large number of coyote accidents occurred between August and October between 1993 and 2002. Unlike Regions 2 and 3, Region 1 had marked increases in coyote accidents between November and February. This may be related to the milder winters experienced in Region 1, which enable coyotes to search for food at greater distances when food is scarcer, thus increasing their likelihood of being involved in an accident. In all Regions, coyote accidents tend to decline between March and June. In Regions 2 and 3, there is a small peak in May, coinciding with the end of gestation for females when they begin to hunt to feed their pups. The small April peak in Region 1 may be indicative of an earlier end to gestation due to milder climate. Detailed analysis by sex is limited because the sex of over 80% of the coyotes reported was unknown. For the months July through October, coyote accidents peak at about the same time bear accidents do in Regions 2 and 3. Coyotes may be following bears onto roads in order to benefit from the remains of the animals bears kill or the remains bears find on the road or in the road right-of-way.

Figure 6.36 Regional Comparisons – Total Annual Coyote Accidents (1983 to 2002)

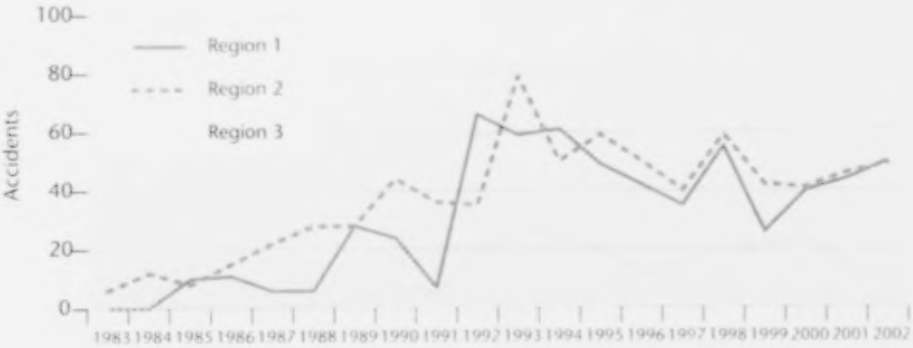


Figure 6.37 – Region 1: Total Monthly Coyote Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

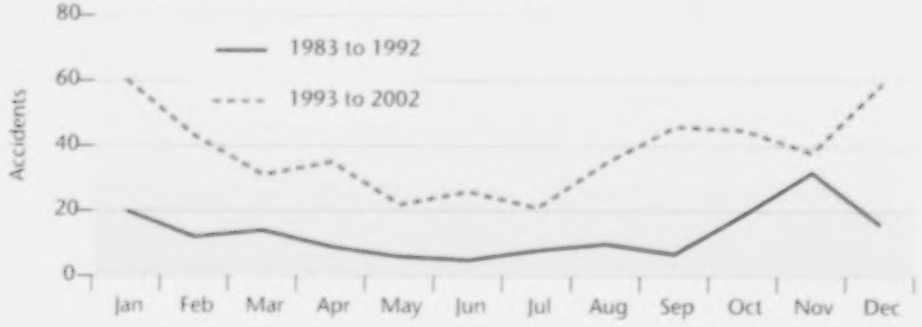


Figure 6.38 – Region 2: Total Monthly Coyote Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

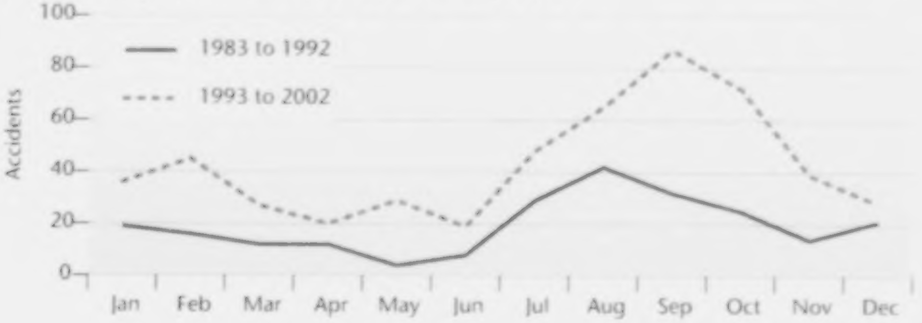
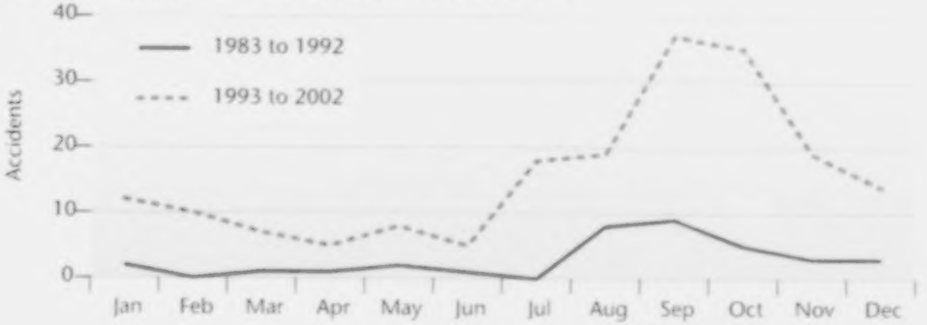


Figure 6.39 – Region 3: Total Monthly Coyote Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



6.9 PORCUPINE

In Region 1, the very small number of porcupine accidents reported limits analysis as no trend appears. Conversely, the increased reporting of these accidents in Regions 2 and 3 show that porcupine accidents are most common between May and October, with a peak occurring in August. In Regions 2 and 3, porcupine accidents appear to exhibit two peaks, the first, a small peak in May, followed by a large peak in August. Although porcupines are not the largest animals found on provincial highways, they constitute a safety hazard as their quills can puncture motor vehicle tires and increase the severity of an accident. (Zacharias, 1999)

Porcupine (Photo: BC Parks)

Porcupine (Photo: Bohen Studios)

Figure 6.40 Regional Comparisons – Total Annual Porcupine Accidents (1983 to 2002)

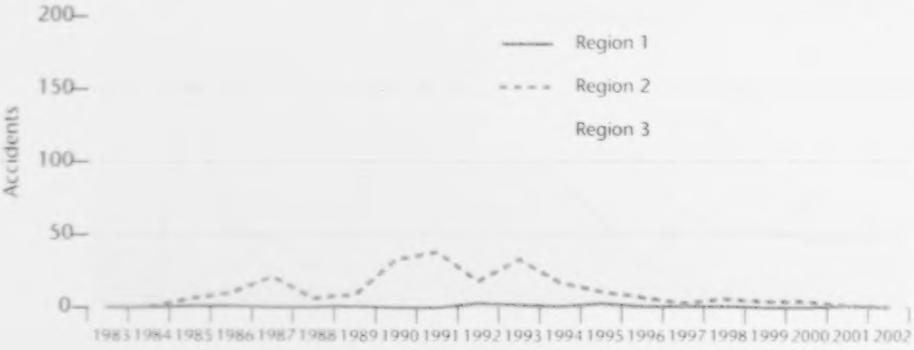


Figure 6.41 – Region 1: Total Monthly Porcupine Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

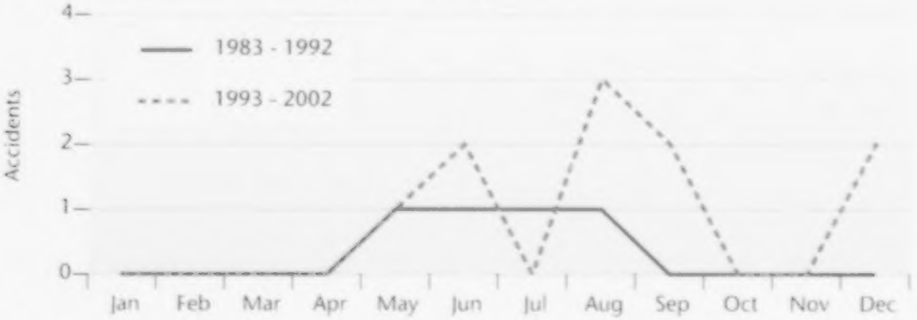


Figure 6.42 – Region 2: Total Monthly Porcupine Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

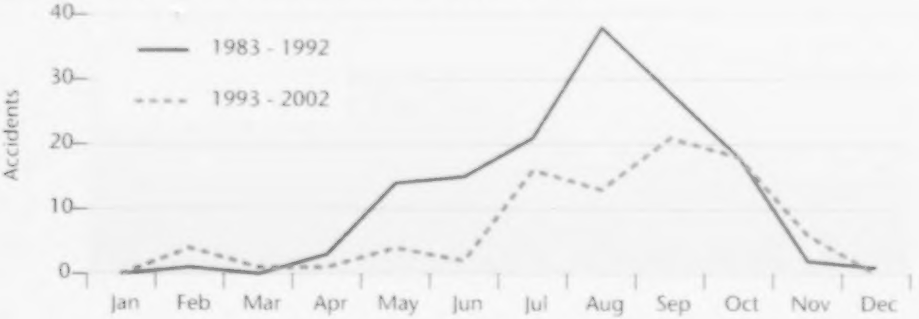
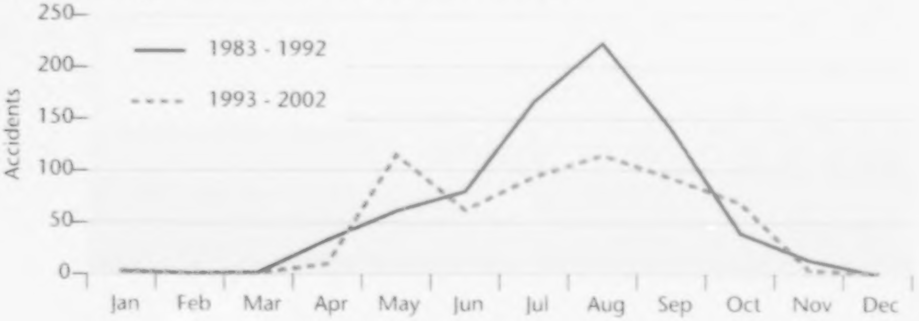


Figure 6.43 – Region 3: Total Monthly Porcupine Accidents

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.0 DISTRICT ACCIDENT STATISTICS

7.1 District Overviews

British Columbia is a vast province. From the Pacific Ocean on the west, to the Rocky Mountains on the east, British Columbia has a very diverse range of physiographic characteristics. From vast ocean beaches, to gently rolling interior plateaus, to rugged mountains, the influence of topography, latitude, longitude and climate are factors in determining the Province's bioclimatic characteristics. The eastward movement of moist air masses off the Pacific Ocean combined with the Province's extremely variable topography leads to British Columbia's tremendous climatic diversity. As the heavy Pacific air masses rise to pass over the Coast Mountains, moisture is deposited creating the leeside rainshadow of the central interior of the Province. The west to east moisture contrast between the humid Pacific Coast and the dry Interior is dramatic, as is the decreasing temperature gradient between the southern border of the Province adjacent to Washington State in the United States, and the Province's northern border adjacent to Alaska and the Yukon. As a result of the size of British Columbia, the three Ministry Regions are divided into eleven Districts for operational purposes. Given their size and unique location, each District tends to have distinct bioclimatic conditions, and consequently characteristic highway/wildlife interactions. Information regarding the following:

1. Geographic Size
2. Geoclimatic Characteristics
3. Highway Information
4. Total Wildlife Accidents by Highway
5. Wildlife Accidents by Species
6. Species Comparisons by Time Series

is provided for each of the following Ministry Districts:

7.2 Region 1 – South Coast Region:

- 7.2.1 District 1 – Lower Mainland
- 7.2.2 District 2 – Vancouver Island

7.3 Region 2 – Southern Interior Region:

- 7.3.1 District 3 – Rocky Mountain
- 7.3.2 District 4 – West Kootenay
- 7.3.3 District 5 – Okanagan-Shuswap
- 7.3.4 District 6 – Thompson-Nicola
- 7.3.5 District 7 – Cariboo

7.4 Region 3 – Northern Region:

- 7.4.1 District 8 – Peace River
- 7.4.2 District 9 – Fort George
- 7.4.3 District 10 – Bulkley-Stikine
- 7.4.4 District 11 – Skeena

7.2 REGION 1 - SOUTH COAST REGION

7.2.1 District 1 - Lower Mainland

Map 7.1

Lower Mainland District

1. Geographic Size

This District is approximately 86,000 km^2 in size

2. Geoclimatic Characteristics

Northern latitude rainforests comprise much of this District. Western Hemlock and Amabilis fir are the dominant climax trees. Abundant precipitation, primarily rainfall, and mild temperatures make the forests in this District the most productive in British Columbia. In the drier parts, old-growth Douglas Fir can approach 100 metres in height, while on floodplains, Western Red Cedar and Sitka Spruce can grow up to four metres in diameter. Mature stands of timber provide valuable habitat for black-tailed deer. At higher elevations, where the growing season is short, forest productivity is reduced. Mountain Hemlock and Amabilis Fir are the dominant tree species. At the highest elevations, of the Coast Mountains, the alpine is essentially treeless. The long, cold winters and short, cool growing season result in a landscape covered in draft shrubs, herbs, lichens and mosses. These areas provide important range for caribou, mountain goats and mountain sheep. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 3, 5, 7, 99, and 101.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.2.1.1 – District 1: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	0	0	33	30	41	31	54	56	14	91	103	87	74	74	41	71	34	36	27	66	963
3	0	0	18	34	3	31	57	60	33	34	43	40	37	12	31	18	21	25	31	17	545
5	0	0	1	7	9	10	9	2	7	9	14	3	3	2	6	0	0	1	0	0	83
7	0	0	3	3	0	1	3	3	4	4	9	11	11	21	11	18	14	16	24	11	167
99	0	0	16	8	21	49	36	42	9	45	29	31	25	31	1	4	17	25	42	24	455
101	0	0	6	38	22	18	37	25	8	17	26	15	25	18	5	13	23	25	0	1	322
Other	0	0	16	12	41	27	93	62	8	54	67	46	57	48	56	55	90	130	204	229	1,295
Totals	**0**	**0**	**93**	**132**	**137**	**167**	**289**	**250**	**83**	**254**	**291**	**233**	**232**	**206**	**151**	**179**	**199**	**258**	**328**	**348**	**3,830**

Table 7.2.1.2 – District 1: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Bear	0	0	9	12	1	2	8	7	4	7	13	11	10	27	5	11	15	10	10	7	**169**
Beaver	0	0	0	0	0	0	2	0	0	0	1	2	2	0	1	0	1	3	5	6	**23**
Bobcat	0	0	0	0	0	1	0	2	0	0	1	1	4	1	0	0	2	0	2	2	**16**
Caribou	0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	**4**
Cougar	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	**2**
Coyote	0	0	10	11	6	6	24	24	7	66	59	61	49	42	34	54	26	39	44	49	**611**
Deer	0	0	72	105	101	133	252	216	70	174	211	153	163	126	105	108	138	183	175	180	**2,665**
Elk	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	**2**
Fox	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	**6**
Horned Owl	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	**3**
Lynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
Moose	0	0	0	0	0	0	1	0	0	1	2	1	0	1	2	2	1	2	3	2	**18**
Muskrat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	**2**
Otter	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	**4**
Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Porcupine	0	0	1	1	0	0	1	0	0	3	2	1	3	1	1	1	0	0	1	0	**16**
Possum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	**3**
Rabbit	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	**3**
Raccoon	0	0	0	1	28	25	0	0	2	0	1	1	1	5	0	0	12	15	68	72	**231**
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Skunk	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5	7	**14**
Wolf	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Other / Unknown	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	2	0	3	8	18	**34**
Totals	**0**	**0**	**93**	**132**	**137**	**167**	**289**	**250**	**83**	**254**	**291**	**233**	**232**	**206**	**151**	**179**	**199**	**258**	**328**	**348**	**3,830**

Table 7.2.2.3 – District 1: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	169	4.4	8.5	50	3.6	5	119	4.9	11.9	53	4	10.6	7	2
Beaver	23	0.6	1.2	2	0.1	0.2	21	0.9	2.1	15	1.1	3	6	1.7
Bobcat	16	0.4	0.8	3	0.2	0.3	13	0.5	1.3	6	0.5	1.2	2	0.6
Caribou	4	0.1	0.2	3	0.2	0.3	1	0	0.1	0	0	0	0	0
Cougar	2	0.1	0.1	0	0	0	2	0.1	0.2	1	0.1	0.2	0	0
Coyote	611	16	30.6	154	11	15.4	457	18.8	45.7	212	16.2	42.4	49	14.1
Deer	2,665	69.6	133.3	1,123	79.9	112.3	1,542	63.6	154.2	784	59.8	156.8	180	51.7
Elk	2	0.1	0.1	1	0.1	0.1	1	0	0.1	1	0.1	0.2	0	0
Fox	6	0.2	0.3	1	0.1	0.1	5	0.2	0.5	3	0.2	0.6	0	0
Horned Owl	3	0.1	0.2	0	0	0	3	0.1	0.3	1	0.1	0.2	0	0
Lynx	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	0	0
Moose	18	0.5	0.9	2	0.1	0.2	16	0.7	1.6	10	0.8	2	2	0.6
Muskrat	2	0.1	0.1	0	0	0	2	0.1	0.2	2	0.2	0.4	1	0.3
Otter	4	0.1	0.2	1	0.1	0.1	3	0.1	0.3	3	0.2	0.6	1	0.3
Owl	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	0	0
Porcupine	16	0.4	0.8	6	0.4	0.6	10	0.4	1	2	0.2	0.4	0	0
Possum	3	0.1	0.2	0	0	0	3	0.1	0.3	3	0.2	0.6	2	0.6
Rabbit	3	0.1	0.2	1	0.1	0.1	2	0.1	0.2	2	0.2	0.4	0	0
Raccoon	231	6	11.6	56	4	5.6	175	7.2	17.5	167	12.7	33.4	72	20.7
Sheep	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	1	0.3
Skunk	14	0.4	0.7	0	0	0	14	0.6	1.4	13	1	2.6	7	2
Wolf	1	0	0.1	1	0.1	0.1	0	0	0	0	0	0	0	0
Other/ Unknown	34	0.9	1.7	1	0.1	0.1	33	1.4	3.3	31	2.4	6.2	18	5.2
TOTALS	**3,830**	**100**	**191.5**	**1,405**	**100**	**140.5**	**2,425**	**100**	**242.5**	**1,312**	**100**	**262.4**	**348**	**100**

Figure 7.2.1.1 - District 1: Total Annual Bear Accidents, (1983 to 2002)

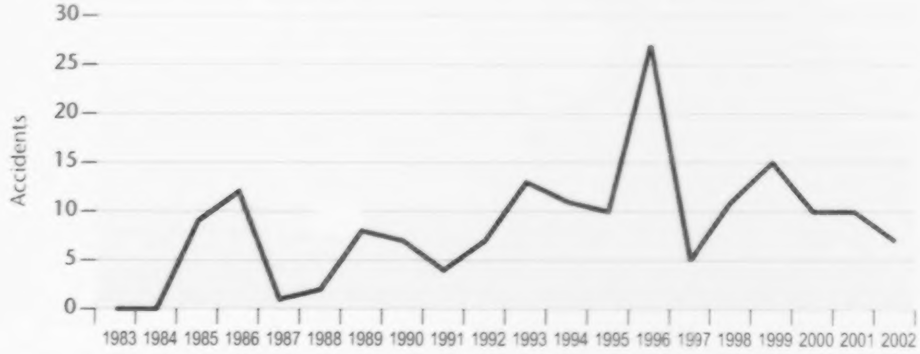


Figure 7.2.1.2 - District 1: Total Annual Deer Accidents, (1983 to 2002)

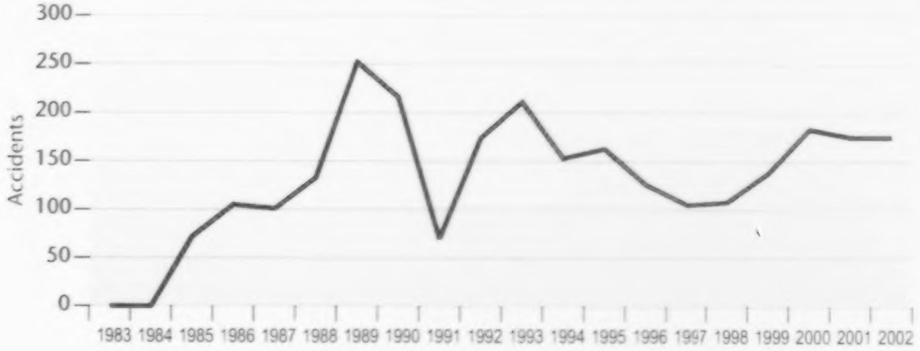


Figure 7.2.1.3 - District 1: Total Annual Elk Accidents, (1983 to 2002)

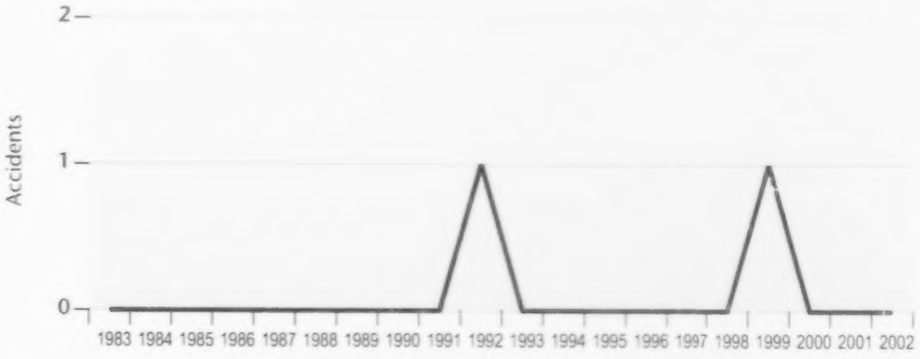


Figure 7.2.1.4 - District 1: Total Annual Moose Accidents, (1983 to 2002)

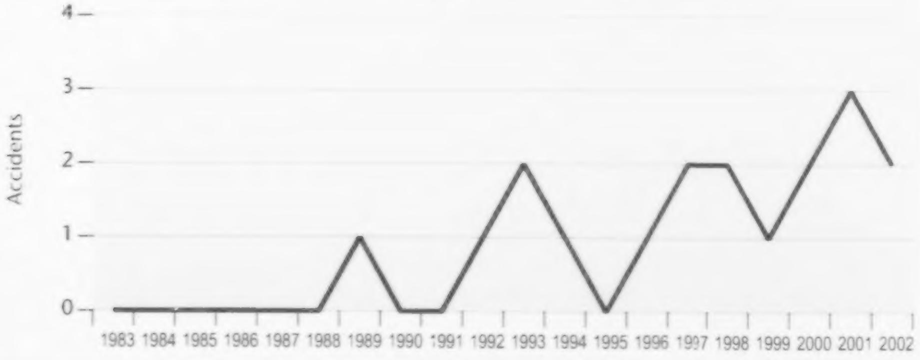


Figure 7.2.1.5 - District 1: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

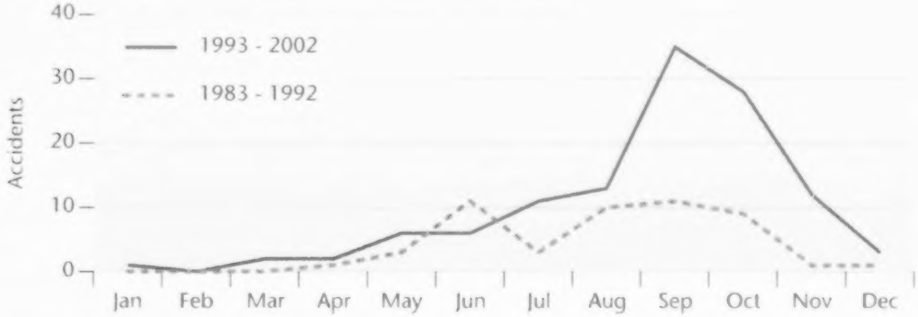


Figure 7.2.1.6 - District 1: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

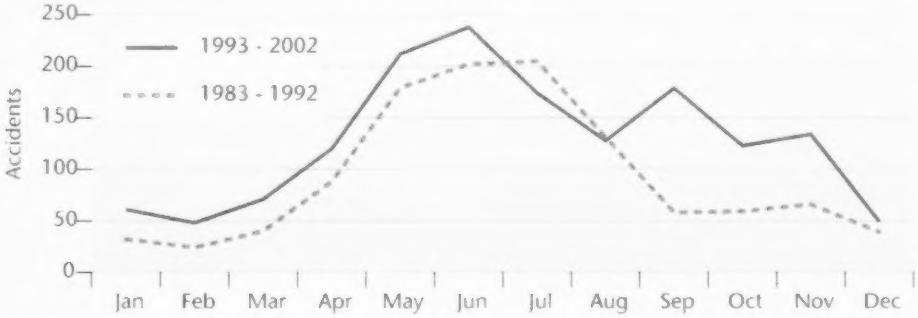


Figure 7.2.1.7 - District 1: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

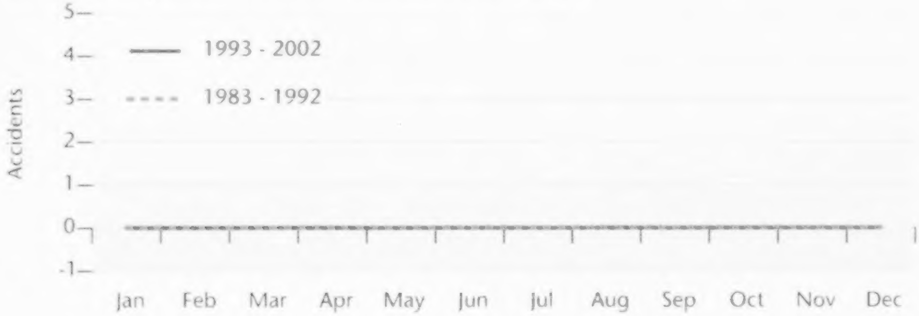
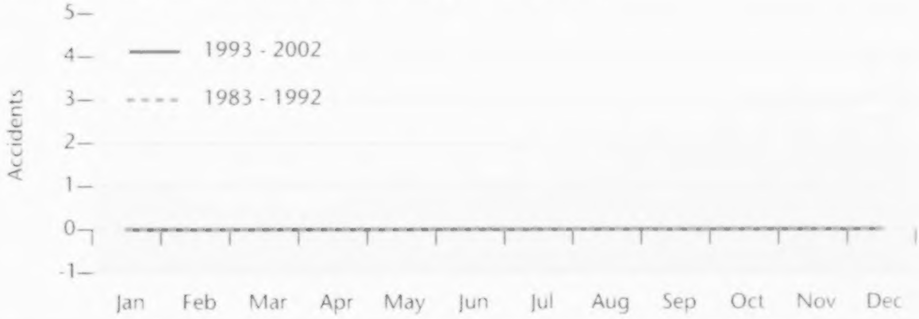


Figure 7.2.1.8 - District 1: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.2.2 District 2 – Vancouver Island

Map 7.2

Vancouver Island District

1. Geographic Size

Vancouver Island District is approximately 32,000 km^2 in size.

2. Geoclimatic Characteristics

Northern latitude rainforests comprise much of this District. Western hemlock and amabilis fir are the dominant climax trees. Abundant precipitation, primarily rainfall, and mild temperatures make the forests in this District the most productive in British Columbia. In the drier parts, old-growth Douglas Fir can approach 100 metres in height, while on floodplains, Western Red Cedar and Sitka Spruce can grow up to four metres in diameter. Mature stands of timber provide valuable habitat for black-tailed deer. At higher elevations, where the growing season is short, forest productivity is reduced. Mountain Hemlock and Amabilis Fir are the dominant tree species.

On the east coast of southern Vancouver Island, in the lee of the Olympic and Vancouver Island Mountains, a mild "Mediterranean" climate prevails. The rainshadow coastal forests are dominated by Douglas Fir, with wetter areas having Western Red Cedar. Gary Oak and Arbutus characteristic of the drier areas occur no other location in Canada. The mild climate results in some of the Province's most productive agricultural land, and habitat for black-tailed deer. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 4, 10, 14, 17, 18, 19, 19A, and 28.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.2.2.1 – District 2: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	0	0	21	29	27	20	101	85	103	105	119	91	62	95	141	119	101	117	95	77	1,508
4	5	0	5	15	13	17	40	26	10	14	63	26	22	21	18	7	13	17	4	8	344
10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	11	16	18	8	10	67
14	0	0	15	7	7	9	39	44	36	33	60	30	25	25	33	44	31	30	23	15	506
17	0	0	4	4	6	12	1	45	5	9	1	9	27	7	11	9	5	9	13	7	184
18	0	0	0	0	0	0	0	1	10	6	16	17	0	1	12	21	26	9	13	8	140
19	37	25	62	63	110	99	239	229	148	204	220	190	152	214	221	276	305	283	316	184	3,577
19A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	21	57	94	88	268
28	6	17	4	3	2	0	14	17	7	3	14	11	11	5	4	8	9	7	2	7	151
Other	27	31	70	79	130	68	168	88	176	282	306	376	434	371	306	382	458	460	516	469	5,197
Totals	**75**	**73**	**181**	**200**	**295**	**225**	**602**	**535**	**495**	**656**	**799**	**751**	**733**	**739**	**756**	**878**	**985**	**1,007**	**1,084**	**873**	**11,942**

Table 7.2.2.2 – District 2: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	1	1	2	2	3	2	6	3	4	6	11	7	6	6	11	9	14	6	14	19	133
Beaver	0	1	1	0	0	0	2	0	1	0	1	4	3	0	1	2	2	6	8	4	36
Bobcat	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cougar	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	4	1	2	1	11
Coyote	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	1	0	1	0	1	8
Deer	74	68	176	193	291	223	588	527	484	643	781	697	712	694	716	824	907	915	999	774	11,286
Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Elk	0	1	0	1	0	0	1	3	2	5	2	5	1	4	0	1	8	16	5	4	59
Fox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	4	0	6
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Moose	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	2	0	2	3	12
Muskrat	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	4
Otter	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	6
Possum	0	0	0	0	0	0	0	0	0	0	0	25	5	3	0	0	0	0	0	2	35
Rabbit	0	0	1	0	0	0	0	0	0	0	0	0	3	0	1	0	0	3	0	1	9
Raccoon	0	0	0	4	0	0	1	1	4	2	4	7	2	31	22	34	32	28	26	31	229
Swan	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Wolf	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
Other/ Unknown	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	14	30	23	32	102
Totals	75	73	181	200	295	225	602	535	495	656	799	751	733	739	756	878	985	1,007	1,085	873	11,943

Table 7.2.2.3 - District 2: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	133	1.1	6.7	30	0.9	3	103	1.2	10.3	62	1.3	12.4	19	2.2
Beaver	36	0.3	1.8	5	0.1	0.5	31	0.4	3.1	22	0.5	4.4	4	0.5
Bobcat	1	0	0.1	1	0	0.1	0	0	0	0	0	0	0	0
Cougar	11	0.1	0.6	0	0	0	11	0.1	1.1	8	0.2	1.6	1	0.1
Coyote	8	0.1	0.4	4	0.1	0.4	4	0	0.4	3	0.1	0.6	1	0.1
Deer	11,286	94.5	564.3	3,267	97.9	326.7	8,019	93.2	801.9	4,419	91.5	883.8	774	88.7
Eagle	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Elk	59	0.5	3	13	0.4	1.3	46	0.5	4.6	34	0.7	6.8	4	0.5
Fox	6	0.1	0.3	0	0	0	6	0.1	0.6	5	0.1	1	0	0
Horse	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Moose	12	0.1	0.6	0	0	0	12	0.1	1.2	10	0.2	2	3	0.3
Muskrat	4	0	0.2	0	0	0	4	0	0.4	0	0	0	0	0
Otter	6	0.1	0.3	0	0	0	6	0.1	0.6	5	0.1	1	1	0.1
Possum	35	0.3	1.8	0	0	0	35	0.4	3.5	2	0	0.4	2	0.2
Rabbit	9	0.1	0.5	1	0	0.1	8	0.1	0.8	4	0.1	0.8	1	0.1
Raccoon	229	1.9	11.5	12	0.4	1.2	217	2.5	21.7	151	3.1	30.2	31	3.6
Swan	1	0	0.1	1	0	0.1	0	0	0	0	0	0	0	0
Wolf	3	0	0.2	2	0.1	0.2	1	0	0.1	0	0	0	0	0
Other / Unknown	102	0.9	5.1	1	0	0.1	101	1.2	10.1	101	2.1	20.2	32	3.7
TOTALS	11,943	100	597.2	3,337	100	333.7	8,606	100	860.6	4,828	100	965.6	873	100

Figure 7.2.2.1 - District 2: Total Annual Bear Accidents, (1983 to 2002)

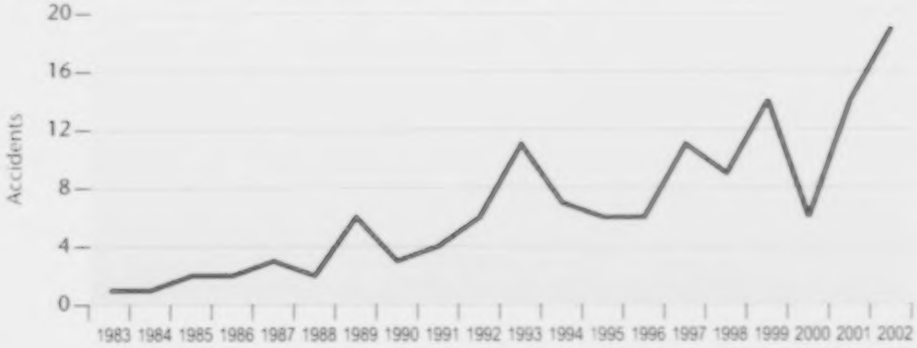


Figure 7.2.2.2 - District 2: Total Annual Deer Accidents, (1983 to 2002)

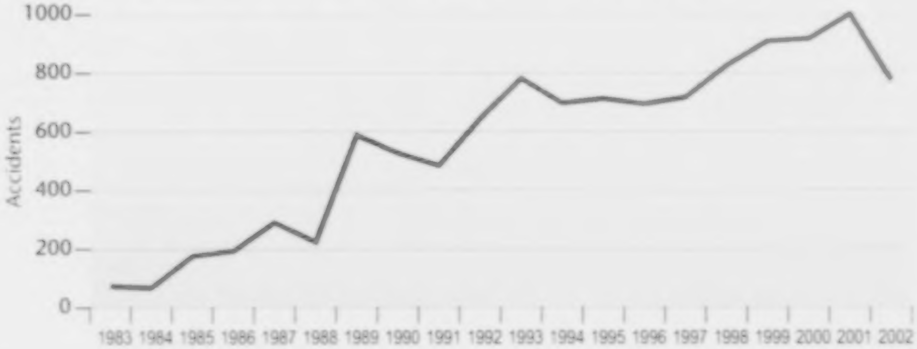


Figure 7.2.2.3 - District 2: Total Annual Elk Accidents, (1983 to 2002)

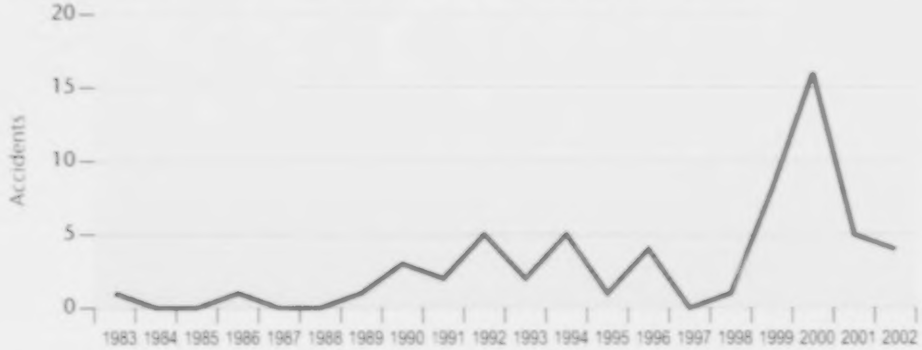


Figure 7.2.2.4 - District 2: Total Annual Moose Accidents, (1983 to 2002)

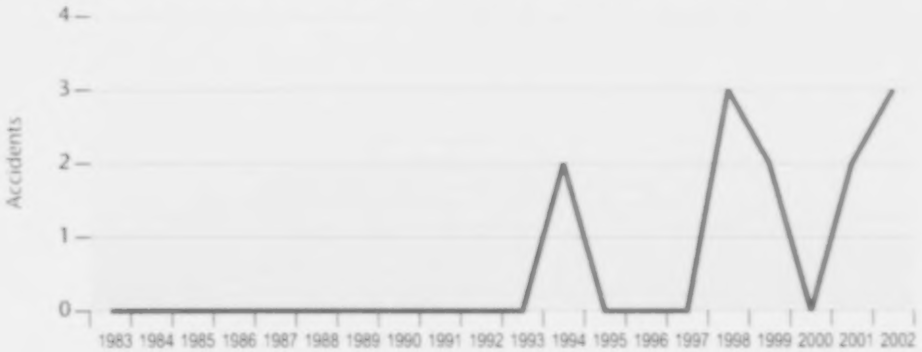


Figure 7.2.2.5 – District 2: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

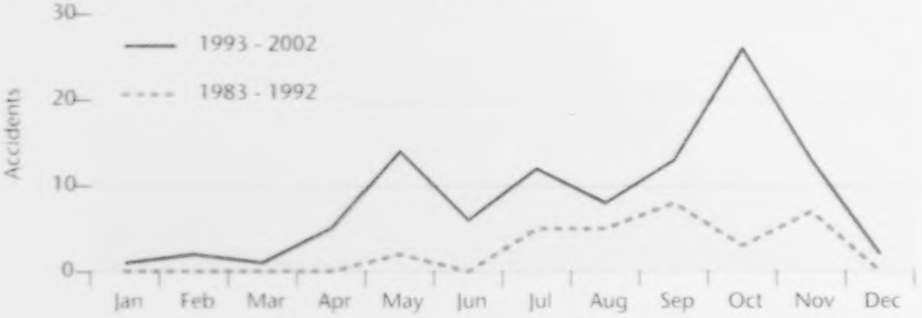


Figure 7.2.2.6 – District 2: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

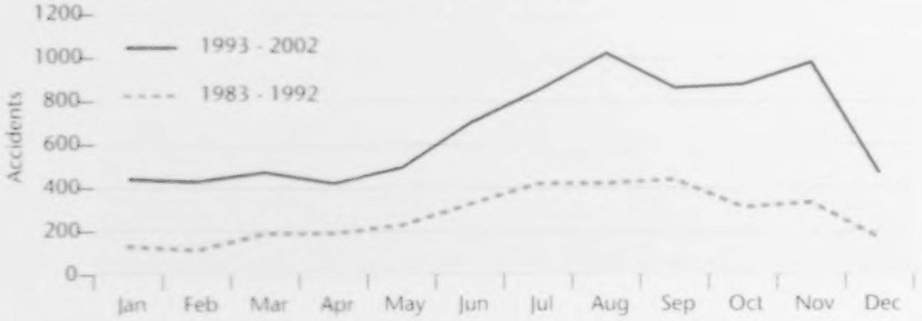


Figure 7.2.2.7 – District 2: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

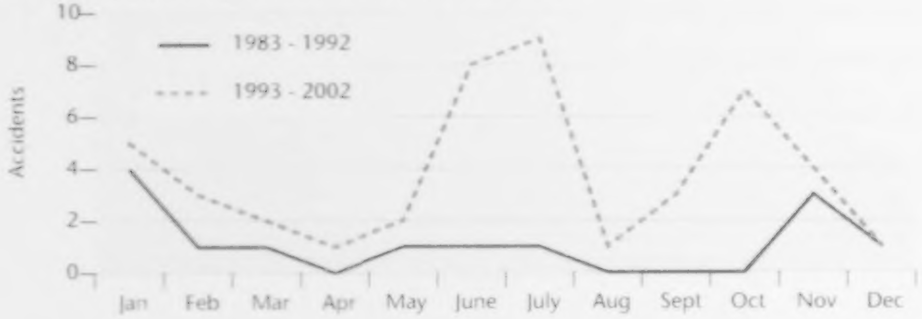
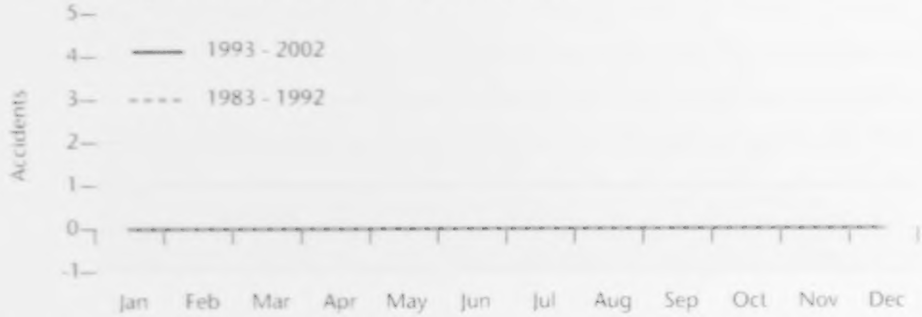


Figure 7.2.2.8 – District 2: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.3 REGION 2 – SOUTHERN INTERIOR REGION

7.3.1 District 3 – Rocky Mountain

Map 7.3

Rocky Mountain District

1. Geographic Size

This District is approximately 34,400 km^2 in size

2. Geoclimatic Characteristics

This District is characterized by deep, narrow valleys running north and south between the Selkirk, Purcell and Rocky Mountain ranges in the Rocky Mountain Trench. Winters are cold, while summers are moderately warm and short.

At the bottoms of the valleys, Ponderosa Pines are the dominant species in the warmest and driest areas. Frequent fires are responsible for maintaining these stands. In wetter, colder areas, Douglas Fir is common. The understory includes abundant grasses such as rough fescue and bluebunch wheatgrass, providing deer and elk habitat.

At higher elevations, the climate is severe, with long cold winters and short cool summers. Only trees capable of tolerating extended periods of frozen ground survive here. The landscape is open parkland, with groupings of trees interspersed with meadow, heath and grassland. The common dominant tree species are Engelmann Spruce, Subalpine Fir and Lodgepole Pine. False Azalea and Rhododendron are common understory shrubs. Due to previous wildfires, successional forest of Lodgepole Pine, Douglas Fir and Trembling Aspen as common. These forests provide important fall forage for mule deer. At drier locations, extensive Whitebark Pine forests can be found. Where snowfall is greater and the soils are wetter, Mountain Hemlock is the common dominant species. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 3, 3A, 3B, 23, 43, 93, 93B, 93/95, 95, and 95A.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Note: The information provided here represents data received and entered into the WARS database by October 23, 2003. A comprehensive review conducted after this date by the Ministry District Office and Maintenance Contractor indicated 819 animals were reported killed in 2001, and 933 animals were reported killed in 2002. These numbers are not included in this report but will be included in the next report.

Table 7.3.1.1 – District 3: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	42	68	79	40	74	53	41	48	44	36	72	67	56	44	35	25	48	21	26	17	936
3	260	275	228	261	257	235	253	292	164	176	226	478	254	218	131	213	200	226	263	312	4,922
3A	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	2	18	10	15	24	73
3B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	12	13	17	14	58
23	13	27	21	13	23	16	21	26	28	13	12	18	9	16	7	12	4	1	5	2	287
43	7	15	5	22	26	12	5	10	16	10	18	20	45	22	13	24	6	27	12	28	343
93	34	34	27	36	39	32	21	23	28	47	61	68	54	44	42	63	138	133	155	8	1,087
93B*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	30
93/95*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	181
95*	172	176	133	192	267	147	117	134	68	111	165	190	115	137	96	163	80	85	90	77	2,715
95A	0	0	0	0	0	0	0	0	23	33	39	94	62	43	26	30	63	62	63	60	598
Other	9	18	9	12	31	18	12	9	8	17	27	38	37	19	39	44	93	128	136	122	826
Totals	**537**	**613**	**502**	**576**	**717**	**513**	**470**	**542**	**379**	**443**	**621**	**975**	**632**	**543**	**390**	**578**	**662**	**706**	**792**	**865**	**12,056**

* *Reporting Highway designation changed in 2001*

Note: The information provided here represents data received and entered into the WARS database by October 23, 2003. A comprehensive review conducted after this date by the Ministry District Office and Maintenance Contractor indicated 819 animals were reported killed in 2001, and 933 animals were reported killed in 2002. These numbers are not included in this report but will be included in the next report.

Table 7.3.1.2 – District 3: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Bear	0	3	8	5	2	8	6	7	11	14	11	8	11	14	15	23	16	9	11	28	210
Beaver	0	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0	1	1	0	4	13
Bobcat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Buffalo	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Caribou	0	1	0	2	0	0	2	0	0	0	0	1	1	3	0	1	0	0	0	2	13
Cougar	0	0	0	0	0	0	0	0	0	1	0	2	1	2	1	0	0	0	0	1	8
Coyote	0	0	1	2	0	6	4	4	6	10	15	19	15	6	4	11	7	6	9	11	136
Deer	246	312	245	286	283	404	361	447	297	363	506	814	515	406	300	440	519	543	605	646	8,538
Dog	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Elk	50	69	35	45	56	65	54	58	40	38	51	91	61	82	54	72	93	118	126	137	1,395
Fox	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	5
Goat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horned Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Horse	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Moose	4	19	12	5	14	18	27	16	17	11	22	21	21	26	12	26	12	17	19	12	331
Mule	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Muskrat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3
Porcupine	0	0	2	3	1	3	4	6	8	3	10	7	4	1	0	0	0	0	1	0	53
Rabbit	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	2	0	0	6
Raccoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Sheep	0	0	0	1	2	7	6	3	0	2	3	11	0	1	1	2	7	3	7	3	59
Skunk	0	0	0	1	0	0	0	1	0	0	1	0	2	1	1	0	0	3	6	5	21
Other/ Unknown	237	208	197	225	358	1	3	0	0	0	0	0	0	0	0	0	4	0	8	14	1,255
TOTALS	537	613	502	576	717	513	470	542	379	443	621	975	632	543	390	578	662	706	792	865	12,056

Table 7.3.1.3 – District 3: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	2	0	0.1	0	0	0	2	0	0.2	2	0.1	0.4	0	0
Bear	210	1.7	10.5	64	1.2	6.4	146	2.2	14.6	87	2.4	17.4	28	3.2
Beaver	13	0.1	0.7	3	0.1	0.3	10	0.1	1	6	0.2	1.2	4	0.5
Bobcat	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Buffalo	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Caribou	13	0.1	0.7	5	0.1	0.5	8	0.1	0.8	3	0.1	0.6	2	0.2
Cougar	8	0.1	0.4	1	0	0.1	7	0.1	0.7	1	0	0.2	1	0.1
Coyote	136	1.1	6.8	33	0.6	3.3	103	1.5	10.3	44	1.2	8.8	11	1.3
Deer	8,538	70.8	426.9	3,244	61.3	324.4	5,294	78.3	529.4	2,753	76.4	550.6	646	74.7
Dog	1	0	0.1	1	0	0.1	0	0	0	0	0	0	0	0
Elk	1,395	11.6	69.8	510	9.6	51	885	13.1	88.5	546	15.2	109.2	137	15.8
Fox	5	0	0.3	2	0	0.2	3	0	0.3	2	0.1	0.4	1	0.1
Goat	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horned Owl	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Horse	2	0	0.1	2	0	0.2	0	0	0	0	0	0	0	0
Moose	331	2.7	16.6	143	2.7	14.3	188	2.8	18.8	86	2.4	17.2	12	1.4
Mule	1	0	0.1	1	0	0.1	0	0	0	0	0	0	0	0
Muskrat	3	0	0.2	0	0	0	3	0	0.3	3	0.1	0.6	0	0
Porcupine	53	0.4	2.7	30	0.6	3	23	0.3	2.3	1	0	0.2	0	0
Rabbit	6	0	0.3	1	0	0.1	5	0.1	0.5	4	0.1	0.8	0	0
Raccoon	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	1	0.1
Sheep	59	0.5	3	21	0.4	2.1	38	0.6	3.8	22	0.6	4.4	3	0.3
Skunk	21	0.2	1.1	2	0	0.2	19	0.3	1.9	14	0.4	2.8	5	0.6
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other/ Unknown	1,255	10.4	62.8	1,229	23.2	122.9	26	0.4	2.6	26	0.7	5.2	14	1.6
TOTALS	**12,056**	**100**	**602.8**	**5,292**	**100**	**529.2**	**6,764**	**100**	**676.4**	**3,603**	**100**	**720.6**	**865**	**100**

Figure 7.3.1.1 - District 3: Total Annual Bear Accidents, (1983 to 2002)

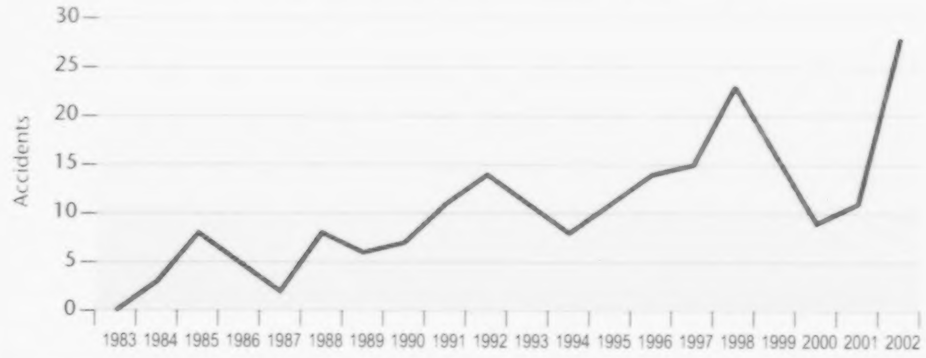


Figure 7.3.1.2 - District 3: Total Annual Deer Accidents, (1983 to 2002)

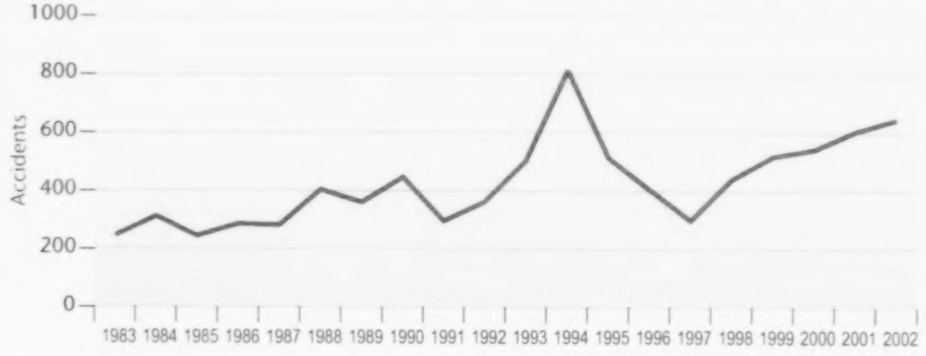


Figure 7.3.1.3 - District 3: Total Annual Elk Accidents, (1983 to 2002)

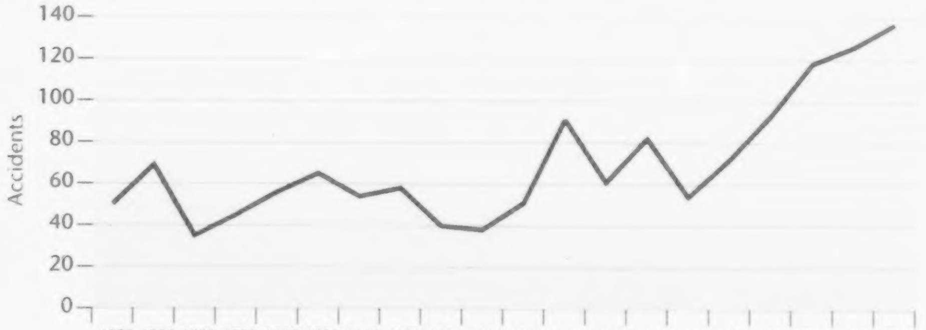


Figure 7.3.1.4 - District 3: Total Annual Moose Accidents, (1983 to 2002)

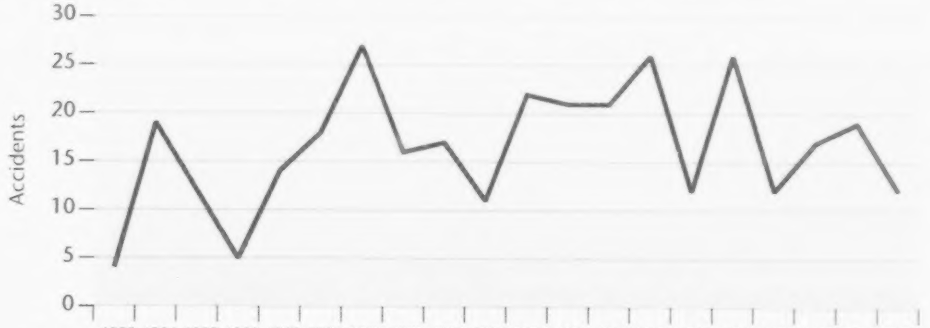


Figure 7.3.1.5 - District 3: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

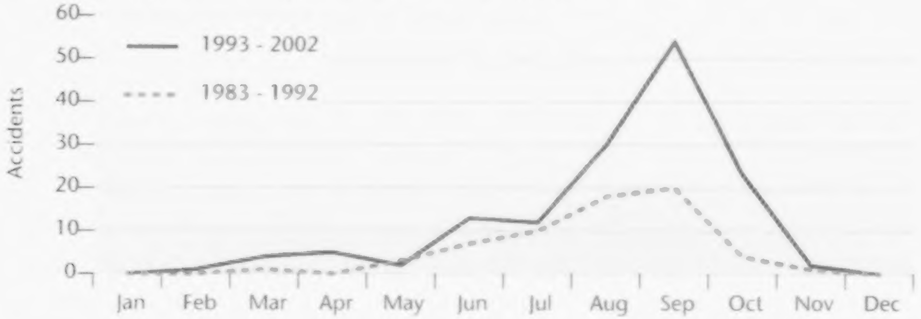


Figure 7.3.1.6 - District 3: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

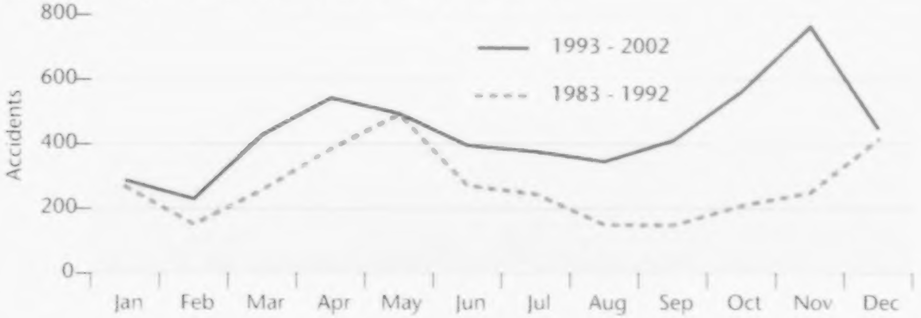


Figure 7.3.1.7 - District 3: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

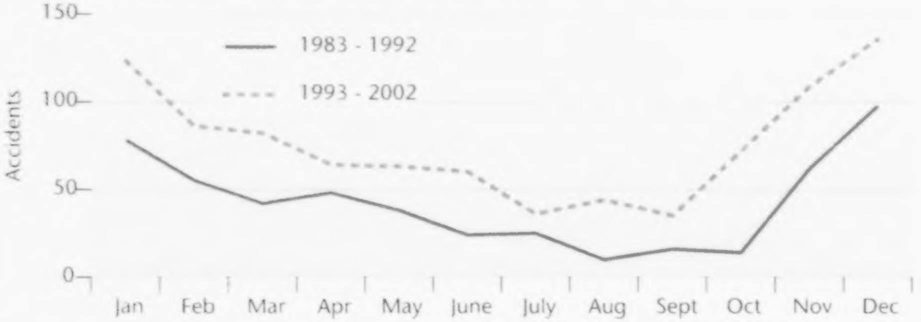


Figure 7.3.1.8 - District 3: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

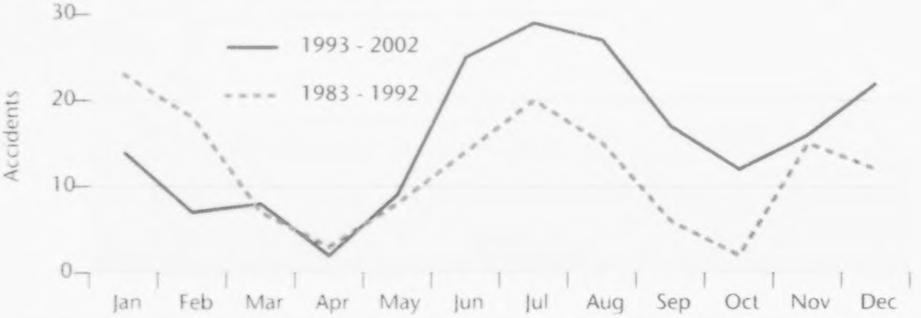


Figure 7.3.1.9 – District 3: Total Annual Coyote Accidents, (1983 to 2002)

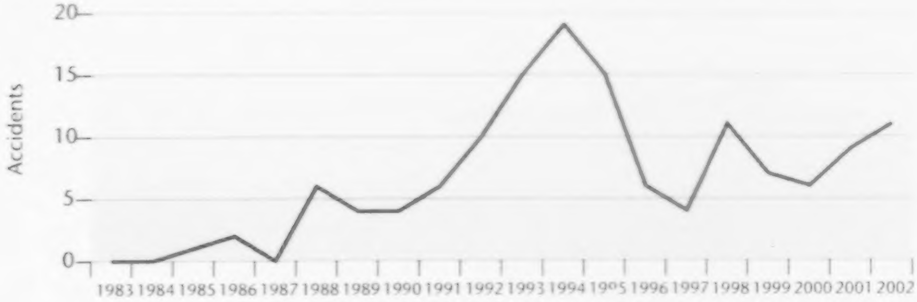
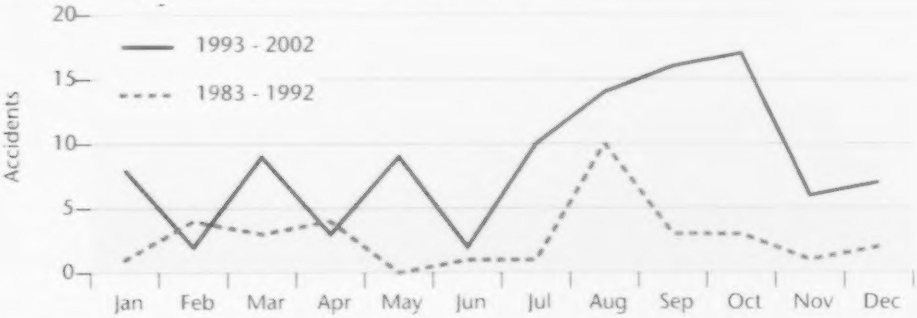


Figure 7.3.1.10 – District 3: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.3.2 District 4 - West Kootenay

Map 7.4

West Kootenay District

1. Geographic Size

This District is approximately 31,400 km^2 in size

2. Geoclimatic Characteristics

This District is has many of the narrowest valleys in the Province. It is transected north to south by the Monashee, Selkirk and Purcell mountain ranges. The District is one of the most productive in the British Columbia southern interior. It has one of widest variety of coniferous tree species of any region of the Province. Winters are cool and wet, while summers are usually warm and dry. Although Western Hemlock and Western Red Cedar are characteristic of the area, Engelmann-White Spruce hybrids and Subalpine Fir are common. At drier locations, Douglas Fir and Lodgepole Pine can be found.

At higher elevations, the climate is severe, with long cold winters and short cool summers. Only trees capable of tolerating extended periods of frozen ground survive here. The landscape is open parkland, with groupings of trees interspersed with meadow, heath and grassland. The common dominant tree species are Engelmann Spruce, Subalpine Fir and Lodgepole Pine. False Azalea and Rhododendron are common understory shrubs. At drier locations, extensive Lodgepole Pine and Whitebark Pine forests can be found. Where snowfall is greater and the soils are wetter, Mountain Hemlock is the common dominant species. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 3, 3A, 3B, 6, 21, 22, 22A, 23, 31, 31A, and 33.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.3.2.1 - District 4: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
3	338	403	378	296	546	399	540	451	359	270	394	506	352	361	182	386	353	347	307	358	**7,526**
3A	0	0	0	0	0	0	0	1	94	43	119	145	109	86	38	41	42	47	79	73	**917**
3B	0	0	0	0	0	0	0	0	30	5	10	35	9	6	6	4	0	0	0	6	**111**
6	71	72	59	42	137	66	70	108	154	76	155	160	179	155	95	99	137	92	112	109	**2,148**
21	3	2	1	0	0	2	1	1	0	1	1	4	1	0	0	4	2	0	1	0	**24**
22	25	29	32	19	0	21	32	14	49	19	35	61	38	22	5	0	1	0	0	2	**404**
22A	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	**3**
23	38	13	13	0	19	2	8	33	23	19	47	13	17	10	3	3	9	5	5	5	**285**
31	14	10	13	2	6	2	14	32	42	6	47	39	39	31	15	21	17	6	15	11	**382**
31A	0	0	0	0	0	0	0	0	0	4	3	10	9	5	1	5	4	0	4	4	**49**
33	80	83	60	49	87	163	169	150	196	110	212	221	176	149	95	147	182	161	155	151	**2,796**
Other	14	19	7	9	4	79	64	39	39	48	58	98	88	43	104	53	92	97	101	146	**1,226**
Totals	583	631	563	417	799	734	898	829	988	601	1,081	1,292	1,017	868	544	764	839	755	779	865	**15,847**

Table 7.3.2.2 – District 4: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Bear	10	9	11	12	0	7	15	4	2	8	10	19	8	13	17	20	24	6	15	32	242
Beaver	0	0	1	0	1	0	2	2	0	2	5	0	0	1	0	0	0	0	1	1	16
Bobcat	0	0	0	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	5
Caribou	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4
Cougar	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
Coyote	1	0	0	2	3	6	5	7	4	2	13	10	4	9	8	2	8	7	7	11	109
Deer	375	412	345	397	477	705	851	786	960	564	1,014	1,227	981	813	500	709	775	709	707	737	14,044
Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
Elk	5	1	3	4	14	8	5	10	13	8	17	18	11	12	7	12	15	12	16	25	216
Fox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	1	4
Horned Owl	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	3
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	4	0	2	0	3	3	5	4	1	3	7	3	6	13	10	5	9	4	14	12	108
Otter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Porcupine	0	0	0	0	6	3	3	13	6	12	4	6	1	1	0	2	0	1	0	0	58
Rabbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Raccoon	0	0	0	0	0	0	3	0	0	1	2	0	1	3	0	1	1	4	3	2	21
Sheep	0	0	0	0	0	0	0	0	0	0	5	0	3	1	1	3	1	0	0	2	16
Skunk	0	0	0	0	0	0	0	0	0	1	4	4	1	1	0	1	0	2	2	3	19
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Other/ Unknown	188	209	200	0	295	2	9	3	0	0	0	0	0	0	0	5	5	8	12	37	973
TOTALS	583	631	563	417	799	734	898	829	988	601	1,081	1,292	1,017	868	544	764	839	755	779	865	15,847

Table 7.3.2.3 - District 4: Species Comparisons by Time Series (1983 To 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	2	0	0.1	1	0	0.1	1	0	0.1	1	0	0.2	1	0.1
Bear	242	1.5	12.1	78	1.1	7.8	164	1.9	16.4	97	2.4	19.4	32	3.7
Beaver	16	0.1	0.8	8	0.1	0.8	8	0.1	0.8	2	0	0.4	1	0.1
Bobcat	5	0	0.3	3	0	0.3	2	0	0.2	1	0	0.2	0	0
Caribou	4	0	0.2	1	0	0.1	3	0	0.3	0	0	0	0	0
Cougar	2	0	0.1	0	0	0	2	0	0.2	1	0	0.2	0	0
Coyote	109	0.7	5.5	30	0.4	3	79	0.9	7.9	35	0.9	7	11	1.3
Deer	14,044	88.6	702.2	5,872	83.4	587.2	8,172	92.8	817.2	3,637	90.9	727.4	737	85.2
Eagle	2	0	0.1	0	0	0	2	0	0.2	2	0	0.4	0	0
Elk	216	1.4	10.8	71	1	7.1	145	1.6	14.5	80	2	16	25	2.9
Fox	4	0	0.2	0	0	0	4	0	0.4	4	0.1	0.8	1	0.1
Horned Owl	3	0	0.2	0	0	0	3	0	0.3	1	0	0.2	0	0
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	108	0.7	5.4	25	0.4	2.5	83	0.9	8.3	44	1.1	8.8	12	1.4
Otter	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	1	0.1
Porcupine	58	0.4	2.9	43	0.6	4.3	15	0.2	1.5	3	0.1	0.6	0	0
Rabbit	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Raccoon	21	0.1	1.1	4	0.1	0.4	17	0.2	1.7	11	0.3	2.2	2	0.2
Sheep	16	0.1	0.8	0	0	0	16	0.2	1.6	6	0.1	1.2	2	0.2
Skunk	19	0.1	1	1	0	0.1	18	0.2	1.8	8	0.2	1.6	3	0.3
Wolf	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Other / Unknown	973	6.1	48.7	906	12.9	90.6	67	0.8	6.7	67	1.7	13.4	37	4.3
TOTALS	15,847	100	792.4	7,043	100	704.3	8,804	100	880.4	4,002	100	800.4	865	100

Figure 7.3.2.1 - District 4: Total Annual Bear Accidents, (1983 to 2002)

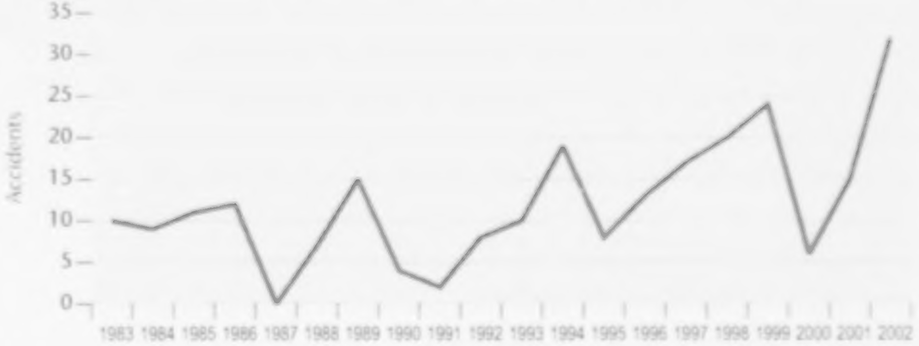


Figure 7.3.2.2 - District 4: Total Annual Deer Accidents, (1983 to 2002)

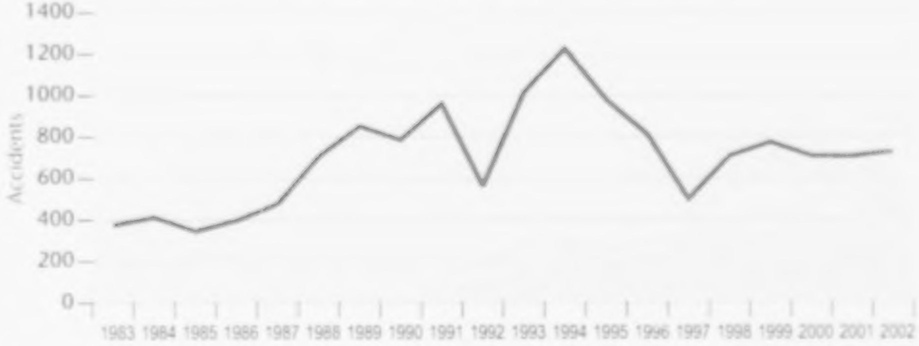


Figure 7.3.2.3 - District 4: Total Annual Elk Accidents, (1983 to 2002)

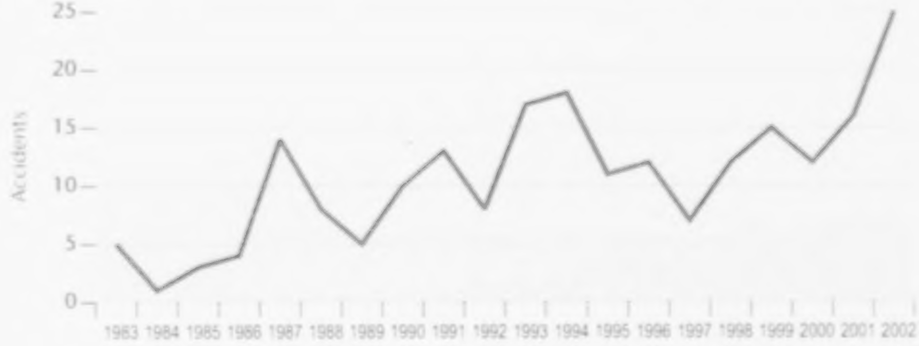


Figure 7.3.2.4 - District 4: Total Annual Moose Accidents, (1983 to 2002)

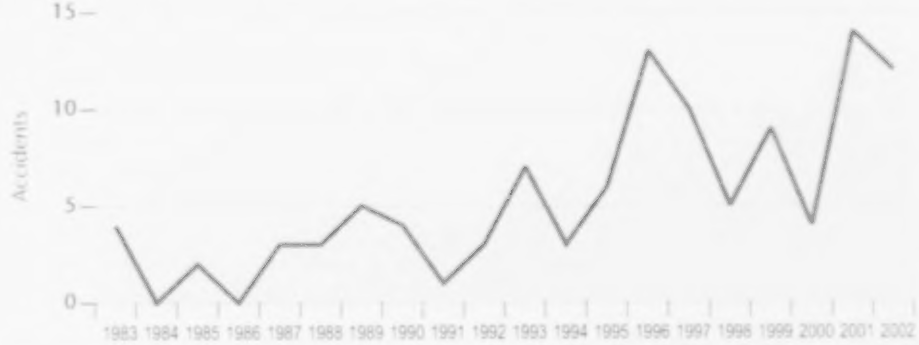


Figure 7.3.2.5 – District 4: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

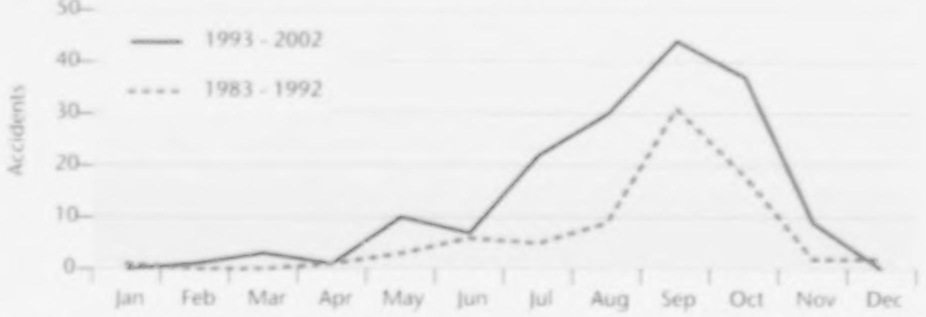


Figure 7.3.2.6 – District 4: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

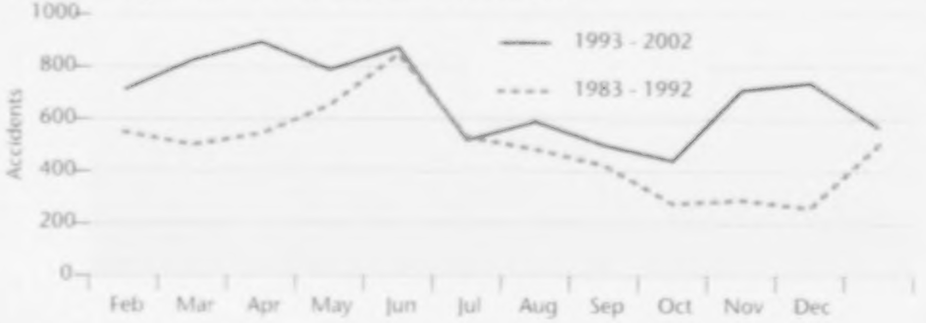


Figure 7.3.2.7 – District 4: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

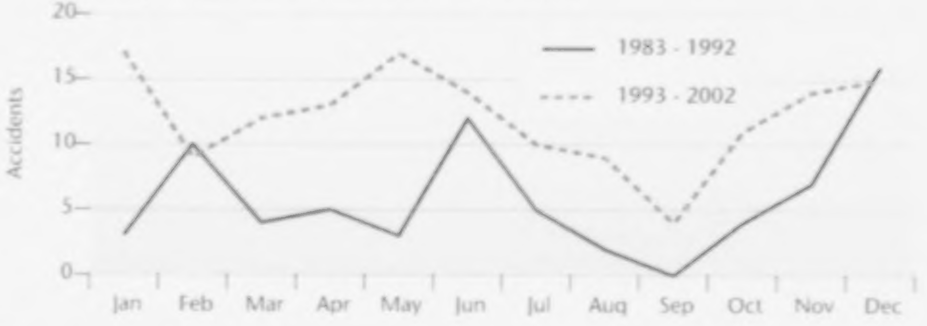


Figure 7.3.2.8 – District 4: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

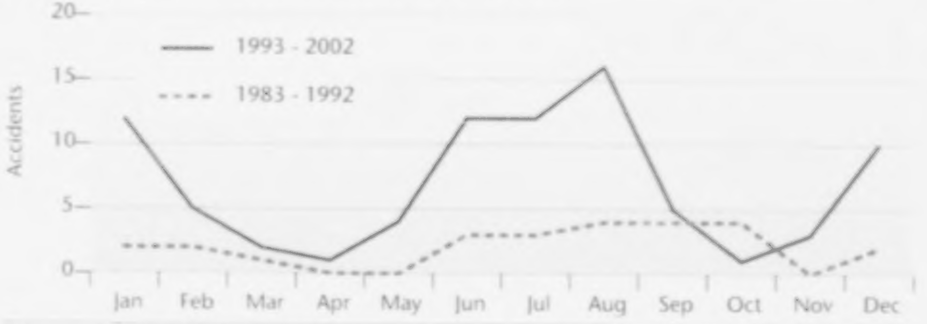


Figure 7.3.2.9 - District 4: Total Annual Coyote Accidents, (1983 to 2002)

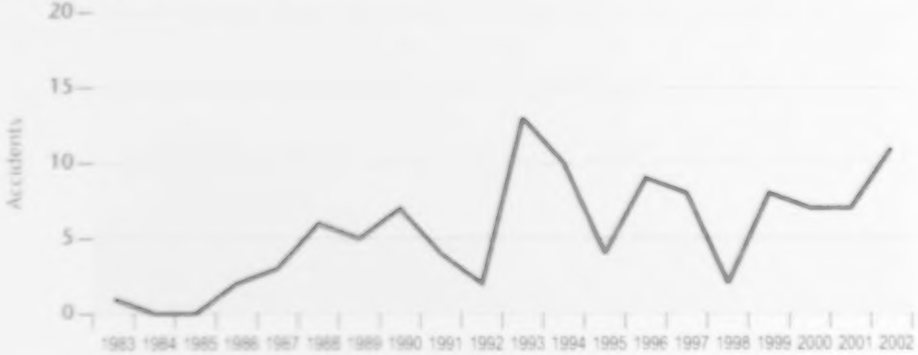
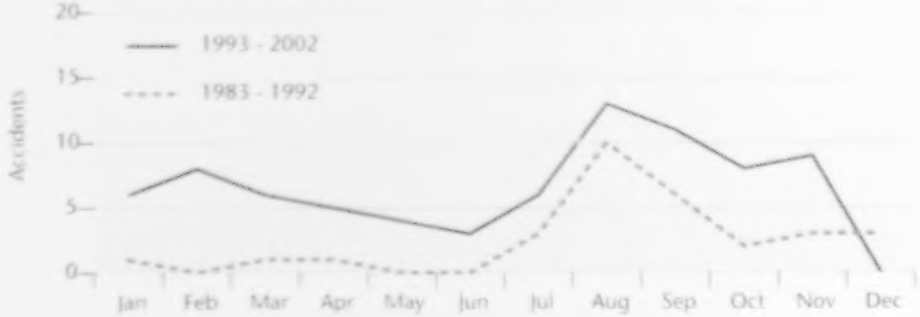


Figure 7.3.2.10 - District 4: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.3.3 District 5 – Okanagan-Shuswap

Map 7.5

Okanagan-Shuswap District

1. Geographic Size

This District is approximately 28,700 km^2 in size

2. Geoclimatic Characteristics

The lower elevations of the valleys in the southern portion of this District are some of the hottest and driest regions of the southern interior in British Columbia. Trees are scarce, and Bluebunch Wheatgrass is the dominant species, while Sagebrush is not uncommon. Although the extremely dry climate restricts their growth, Ponderosa Pine and Douglas Fir occasionally occur in depressions and on coarser textured soils. The grassland provides critical winter and spring forage for bighorn sheep and white-tailed deer.

Immediately above the grasslands, Douglas Fir tends to be the dominant species. Where frequent wildfires have occurred, even-aged Ponderosa Pine forests occur at lower elevations while even-aged Lodgepole Pine forests can be found at higher elevations. The understory is dominated by Feathermoss and Pinegrass with Soopolalie and Kinnikinnick being common shrubs. At the drier locations, the landscape becomes savannah-like with bunchgrasses including Bluebunch Wheatgrass and Rough Fescue providing important summer habitat for mule deer and elk.

At higher elevations in the valleys, the plateau areas experience cold winters and moderately short and warm summers. The common tree species are Engelmann and hybrid spruce, and Subalpine Fir. Successional forests of Lodgepole Pine, Douglas Fir and Trembling Aspen are the result of past wildfires. These areas provide important summer and fall forage for mule deer.

In the northeastern portion of this District, the climate is severe, with long cold winters and short cool summers. Only trees capable of tolerating extended periods of frozen ground survive here. The landscape is open parkland, with groupings of trees interspersed with meadow, heath and grassland. The common dominant tree species are Engelmann Spruce, Subalpine Fir and Lodgepole Pine. False Azalea and Rhododendron are common understory shrubs. At drier locations, extensive Lodgepole Pine and Whitebark Pine forests can be found. Where snowfall is greater and the soils are wetter, Mountain Hemlock is the common dominant species. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 3, 3A, 3B, 5, 5A, 6, 31, 33, 97, and 97A.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.3.3.1 - District 5: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	16	20	17	26	36	28	46	35	26	20	17	50	40	20	23	37	61	40	49	61	668
3	87	94	107	61	97	151	172	152	84	53	113	47	92	66	51	60	90	90	67	43	1,777
3A	0	0	0	0	0	0	0	0	8	14	21	19	33	29	6	18	11	27	23	13	222
3B	0	0	0	0	0	0	0	0	3	2	4	2	5	3	3	3	0	5	0	0	30
5	8	8	9	7	4	9	12	10	6	1	4	1	0	1	7	10	4	5	2	0	108
5A	0	0	0	0	0	0	0	1	4	3	13	4	24	9	1	6	11	15	10	4	105
6	0	40	25	32	52	67	63	60	64	76	94	128	99	62	27	56	45	48	53	44	1,135
31	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	11	12	7	2	13	46
33	3	7	7	7	18	13	9	24	14	13	35	6	19	15	20	30	31	24	21	20	336
97	85	146	89	94	64	98	129	120	118	61	161	64	109	131	276	236	132	139	152	101	2,505
97A	0	0	0	0	0	0	0	0	19	8	24	17	43	13	26	21	20	17	38	8	254
Other	9	19	21	38	32	33	49	57	56	56	92	91	90	49	58	90	89	72	90	76	1,167
Totals	208	334	275	265	303	399	480	459	402	307	578	429	555	398	498	578	506	489	507	383	8,353

Table 7.3.3.2 – District 5: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Bear	4	3	2	5	10	2	2	4	4	3	10	10	8	4	8	12	19	9	12	11	**142**
Beaver	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	1	3	0	1	**10**
Bobcat	0	0	0	0	0	0	1	0	1	0	2	0	0	1	0	0	0	0	0	0	**5**
Caribou	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	**3**
Cougar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	**3**
Coyote	0	0	2	3	1	2	5	8	9	4	19	4	12	5	3	17	9	10	11	10	**134**
Deer	201	324	260	250	275	393	465	438	372	298	535	412	519	378	478	535	468	443	464	338	**7,846**
Elk	0	0	1	0	0	1	3	0	1	0	1	0	2	1	0	1	1	3	3	2	**20**
Fox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**2**
Horned Owl	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	**3**
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	**2**
Lynx	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Moose	0	2	3	3	1	1	1	3	7	1	3	0	1	2	3	2	2	5	5	8	**53**
Porcupine	0	0	1	1	6	0	1	1	7	0	4	2	4	1	0	2	1	2	0	0	**33**
Raccoon	0	0	0	0	0	0	0	0	0	0	1	0	1	5	0	1	0	1	2	1	**12**
Sheep	0	3	3	3	2	0	1	3	1	0	2	1	3	1	4	1	0	7	0	0	**35**
Skunk	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	1	1	**7**
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Other/ Unknown	3	2	2	0	8	0	0	1	0	0	0	0	0	0	0	1	4	4	5	10	**40**
TOTALS	**208**	**334**	**275**	**265**	**303**	**399**	**480**	**459**	**402**	**307**	**578**	**429**	**555**	**398**	**498**	**578**	**506**	**489**	**507**	**383**	**8,353**

Table 7.3.3.3 – District 5: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	1	0	0.1	1	0	0.1	0	0	0	0	0	0	0	0
Bear	142	1.7	7.1	39	1.1	3.9	103	2.1	10.3	63	2.6	12.6	11	2.9
Beaver	10	0.1	0.5	1	0	0.1	9	0.2	0.9	5	0.2	1	1	0.3
Bobcat	5	0.1	0.3	2	0.1	0.2	3	0.1	0.3	0	0	0	0	0
Caribou	3	0	0.2	1	0	0.1	2	0	0.2	2	0.1	0.4	0	0
Cougar	3	0	0.2	0	0	0	3	0.1	0.3	3	0.1	0.6	1	0.3
Coyote	134	1.6	6.7	34	1	3.4	100	2	10	57	2.3	11.4	10	2.6
Deer	7,846	93.9	392.3	3,276	95.5	327.6	4,570	92.9	457	2,248	91.3	449.6	338	88.3
Elk	20	0.2	1	6	0.2	0.6	14	0.3	1.4	10	0.4	2	2	0.5
Fox	2	0	0.1	0	0	0	2	0	0.2	2	0.1	0.4	0	0
Horned Owl	3	0	0.2	1	0	0.1	2	0	0.2	2	0.1	0.4	0	0
Horse	2	0	0.1	0	0	0	2	0	0.2	2	0.1	0.4	0	0
Lynx	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Moose	53	0.6	2.7	22	0.6	2.2	31	0.6	3.1	22	0.9	4.4	8	2.1
Porcupine	33	0.4	1.7	17	0.5	1.7	16	0.3	1.6	5	0.2	1	0	0
Raccoon	12	0.1	0.6	0	0	0	12	0.2	1.2	5	0.2	1	1	0.3
Sheep	35	0.4	1.8	16	0.5	1.6	19	0.4	1.9	8	0.3	1.6	0	0
Skunk	7	0.1	0.4	0	0	0	7	0.1	0.7	4	0.2	0.8	1	0.3
Wolf	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Other / Unknown	40	0.5	2	16	0.5	1.6	24	0.5	2.4	24	1	4.8	10	2.6
TOTALS	8,353	100	417.7	3,432	100	343.2	4,921	100	492.1	2,463	100	492.6	383	100

Figure 7.3.3.1 - District 5: Total Annual Bear Accidents, (1983 to 2002)

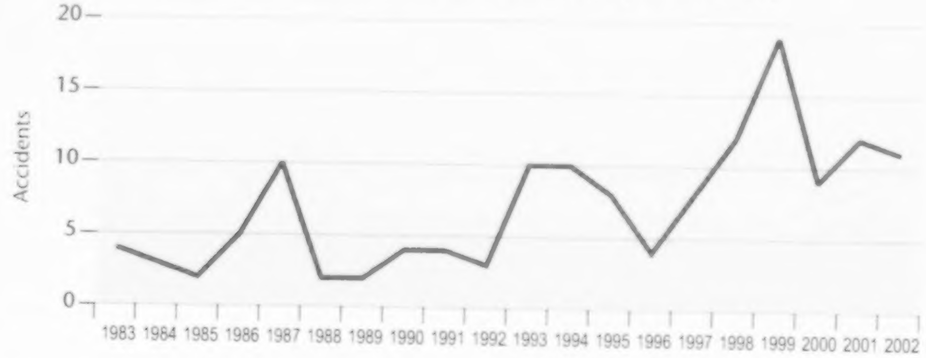


Figure 7.3.3.2 - District 5: Total Annual Deer Accidents, (1983 to 2002)

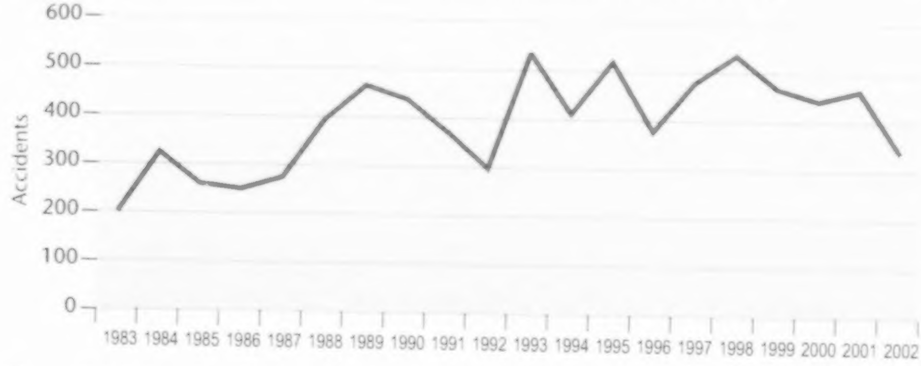


Figure 7.3.3.3 - District 5: Total Annual Elk Accidents, (1983 to 2002)

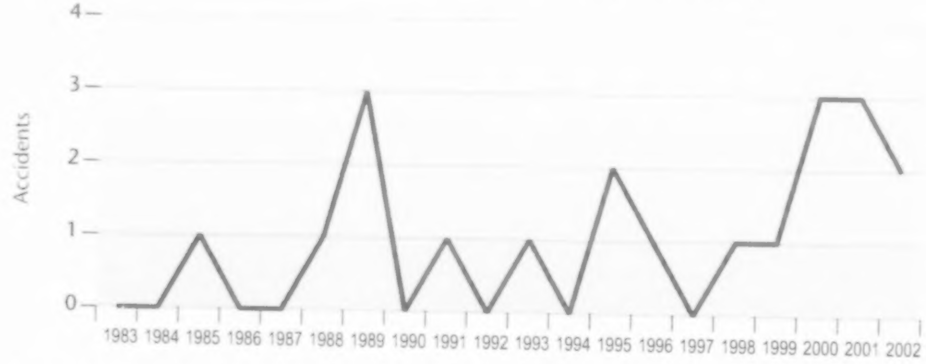


Figure 7.3.3.4 - District 5: Total Annual Moose Accidents, (1983 to 2002)

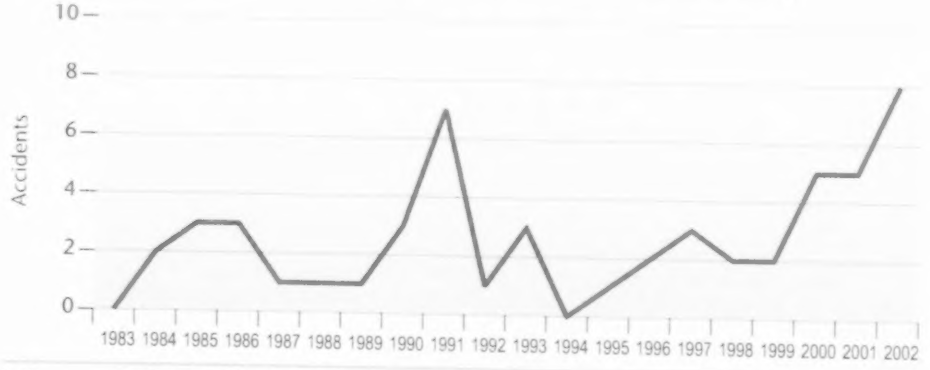


Figure 7.3.3.5 – District 5: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

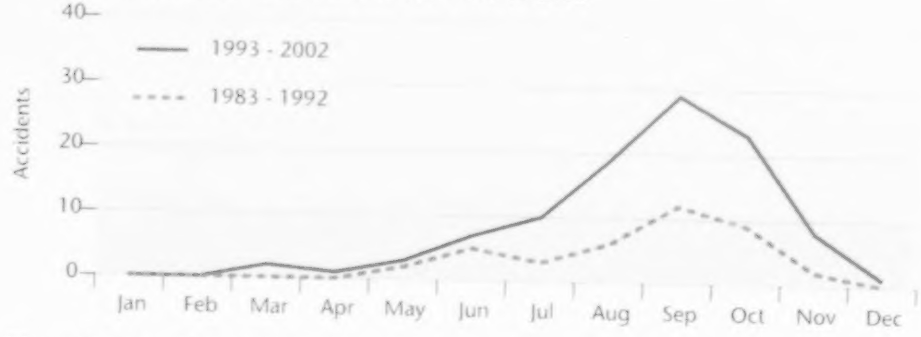


Figure 7.3.3.6 – District 5: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

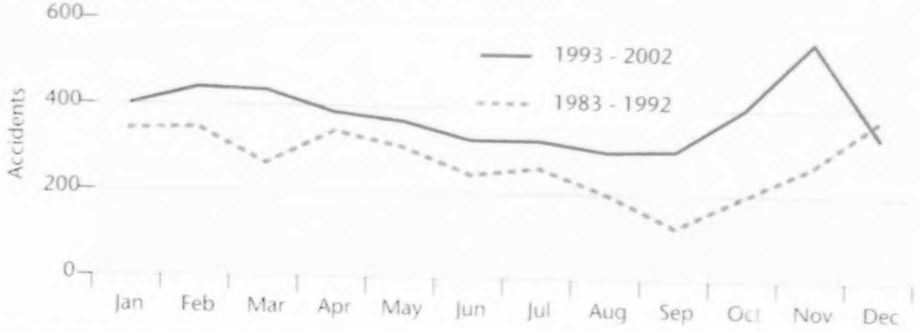


Figure 7.3.3.7 – District 5: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

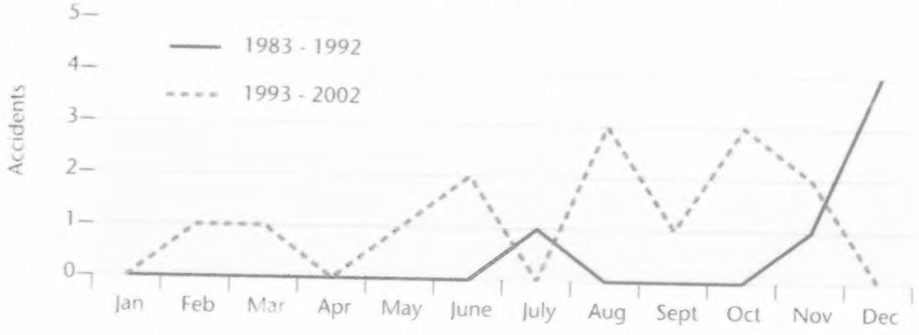


Figure 7.3.3.8 – District 5: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

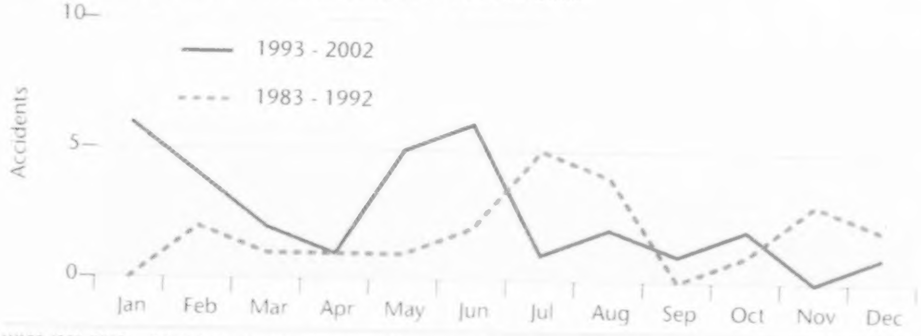


Figure 7.3.3.9 - District 5: Total Annual Coyote Accidents, (1983 to 2002)

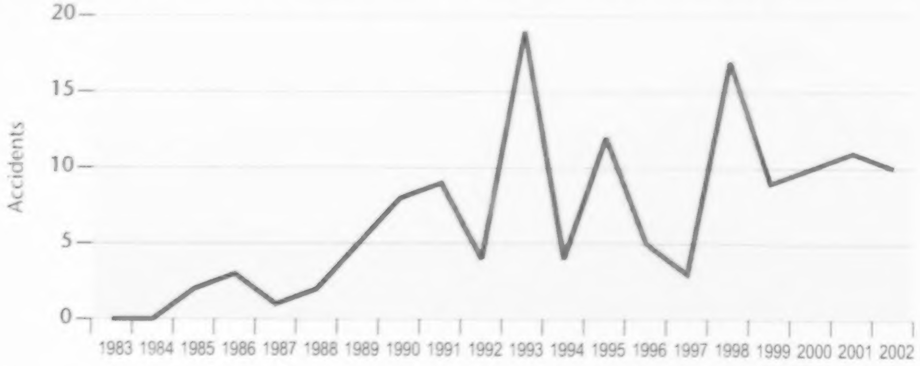
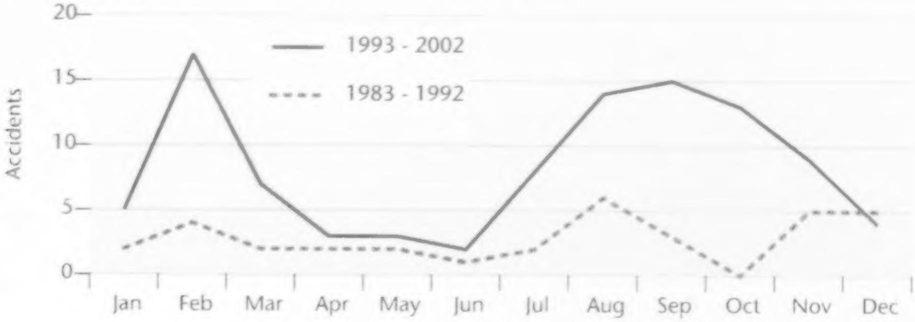


Figure 7.3.3.10 - District 5: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.3.4 District 6 - Thompson-Nicola

Map 7.6

Thompson-Nicola District

1. Geographic Size

This District is approximately 25,400 km^2 in size

2. Geoclimatic Characteristics

In the rainshadow of the Coast Mountains, the lower elevations of the valleys in this District are some of the hottest and driest regions of the British Columbia southern interior. Trees are scarce, and Bluebunch Wheatgrass is the dominant species, while Sagebrush is not uncommon. Although the extremely dry climate restricts their growth, Ponderosa Pine and Douglas Fir occasionally occur in depressions and on coarser textured soils. The grassland provides critical winter and spring forage for bighorn sheep and white-tailed deer.

Immediately above the grasslands, Douglas Fir tends to be the dominant species. Where frequent wildfires have occurred, even-aged Ponderosa Pine forests occur at lower elevations while even-aged Lodgepole Pine forests can be found at higher elevations. The understory is dominated by Feathermoss and Pinegrass with Soopolalie and Kinnikinnick being common shrubs. At the drier locations, the landscape becomes savannah-like with bunchgrasses including Bluebunch Wheatgrass and Rough Fescue providing important summer habitat for mule deer and elk.

At higher elevations, the plateau areas experience cold winters and moderately short and warm summers. The common tree species are Engelmann and hybrid spruce, and Subalpine Fir. Successional forests of Lodgepole Pine, Douglas Fir and Trembling Aspen are the result of past wildfires. These areas provide important summer and fall forage for mule deer. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 5, 5A, 8, 24, 97, and 97C.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.3.4.1 – District 6: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	15	26	26	22	30	39	26	17	27	27	33	40	53	51	63	59	57	48	49	71	779
5	17	26	25	70	141	138	50	153	139	116	102	100	106	93	89	99	127	86	140	48	1,865
5A	0	0	0	0	0	0	0	0	17	4	8	15	9	6	11	3	2	7	5	9	96
8	0	0	1	0	2	4	0	1	0	0	3	7	2	3	1	5	1	0	1	1	32
24	0	0	0	0	0	1	3	2	2	1	0	1	0	0	3	4	4	14	6	3	44
97	0	0	0	0	0	0	0	0	2	4	0	0	2	0	1	20	20	20	18	10	97
97C	0	0	0	0	0	0	0	0	5	5	8	16	14	26	14	0	8	2	4	10	112
Other	10	6	4	4	9	6	7	6	5	18	14	16	13	19	23	10	13	26	30	79	318
Totals	42	58	56	96	182	188	86	179	197	175	168	195	199	198	205	200	232	203	253	231	3,343

Table 7.3.4.2 – District 6: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Badger	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	3
Bear	0	2	2	8	9	4	5	8	9	10	15	10	13	6	9	17	19	15	18	22	201
Beaver	0	0	0	1	1	3	0	5	0	1	1	0	0	1	2	0	1	1	2	3	22
Bobcat	0	0	0	0	0	0	0	0	2	5	1	0	0	3	0	0	0	1	0	0	12
Caribou	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	4
Coyote	0	0	4	6	17	11	13	20	13	16	18	11	20	20	14	19	15	11	16	11	255
Deer	41	53	45	77	144	164	65	126	151	137	127	157	156	159	173	153	178	158	206	182	2,652
Elk	1	3	3	1	1	3	0	0	0	2	0	0	2	0	1	1	0	0	0	0	18
Fox	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	4
Horned Owl	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	4
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	1	1	5	2	3	9	8	3	1	14	3	4	3	5	7	6	2	5	82
Porcupine	0	0	1	2	5	0	0	9	12	0	4	2	1	3	3	2	3	1	0	0	48
Raccoon	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	1	0	5
Sheep	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	2	1	3	1	0	10
Skunk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
Other/ Unknown	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	3	3	3	7	20
TOTALS	42	58	56	96	182	188	86	179	197	175	168	195	199	198	205	200	232	203	253	231	3,343

Table 7.3.4.3 - District 6: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Badger	3	0.1	0.2	0	0	0	3	0.1	0.3	2	0.2	0.4	0	0
Bear	201	6	10.1	57	4.5	5.7	144	6.9	14.4	91	8.1	18.2	22	9.5
Beaver	22	0.7	1.1	11	0.9	1.1	11	0.5	1.1	7	0.6	1.4	3	1.3
Bobcat	12	0.4	0.6	7	0.6	0.7	5	0.2	0.5	1	0.1	0.2	0	0
Caribou	4	0.1	0.2	1	0.1	0.1	3	0.1	0.3	0	0	0	0	0
Coyote	255	7.6	12.8	100	7.9	10	155	7.4	15.5	72	6.4	14.4	11	4.8
Deer	2,652	79.3	132.6	1,003	79.7	100.3	1,649	79.1	164.9	877	78.4	175.4	182	78.8
Elk	18	0.5	0.9	14	1.1	1.4	4	0.2	0.4	1	0.1	0.2	0	0
Fox	4	0.1	0.2	0	0	0	4	0.2	0.4	3	0.3	0.6	1	0.4
Horned Owl	4	0.1	0.2	0	0	0	4	0.2	0.4	3	0.3	0.6	0	0
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	82	2.5	4.1	32	2.5	3.2	50	2.4	5	25	2.2	5	5	2.2
Porcupine	48	1.4	2.4	29	2.3	2.9	19	0.9	1.9	6	0.5	1.2	0	0
Raccoon	5	0.1	0.3	1	0.1	0.1	4	0.2	0.4	4	0.4	0.8	0	0
SHEEP	10	0.3	0.5	1	0.1	0.1	9	0.4	0.9	7	0.6	1.4	0	0
Skunk	3	0.1	0.2	0	0	0	3	0.1	0.3	3	0.3	0.6	0	0
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other / Unknown	20	0.6	1	3	0.2	0.3	17	0.8	1.7	17	1.5	3.4	7	3
TOTALS	3,343	100	167.2	1,259	100	125.9	2,084	100	208.4	1,119	100	223.8	231	100

Figure 7.3.4.1 - District 6: Total Annual Bear Accidents, (1983 to 2002)

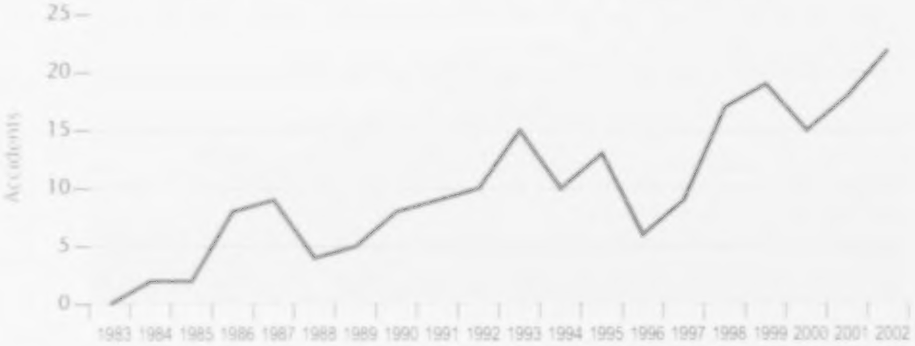


Figure 7.3.4.2 - District 6: Total Annual Deer Accidents, (1983 to 2002)

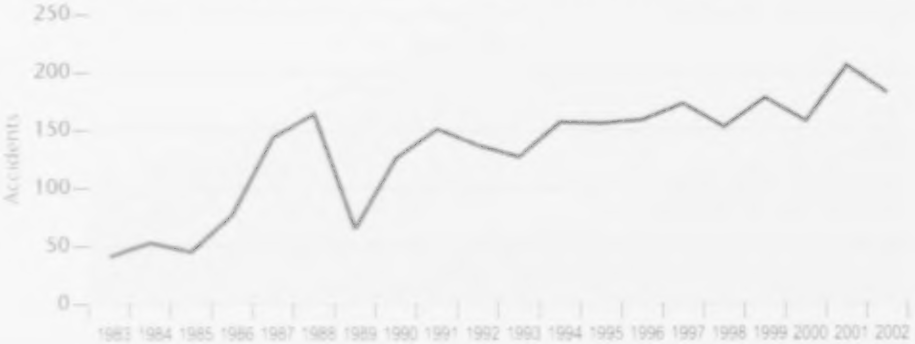


Figure 7.3.4.3 - District 6: Total Annual Elk Accidents, (1983 to 2002)

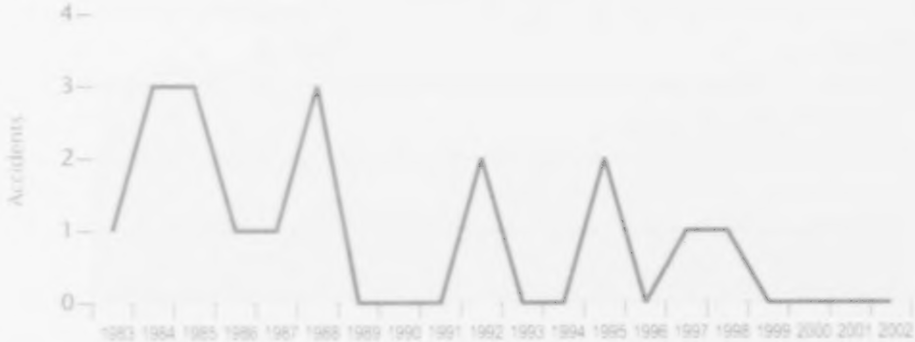


Figure 7.3.4.4 - District 6: Total Annual Moose Accidents, (1983 to 2002)

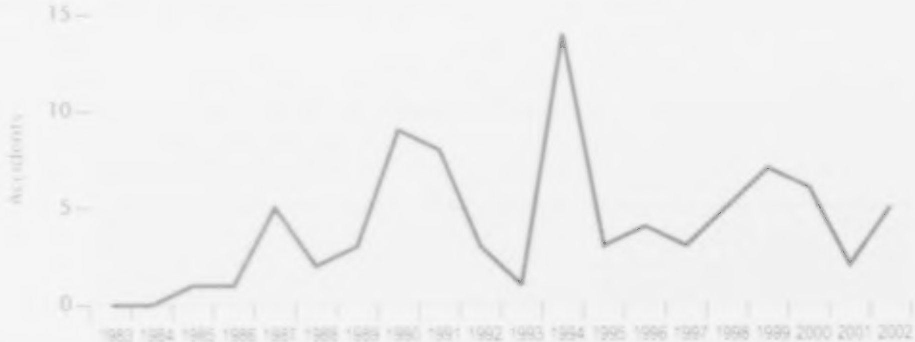


Figure 7.3.4.5 – District 6: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

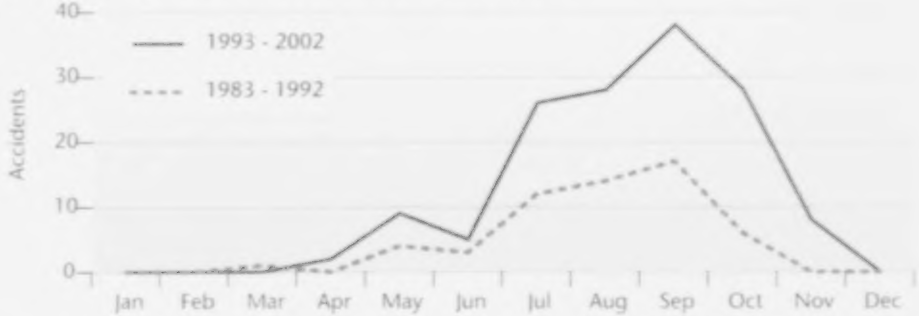


Figure 7.3.4.6 – District 6: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

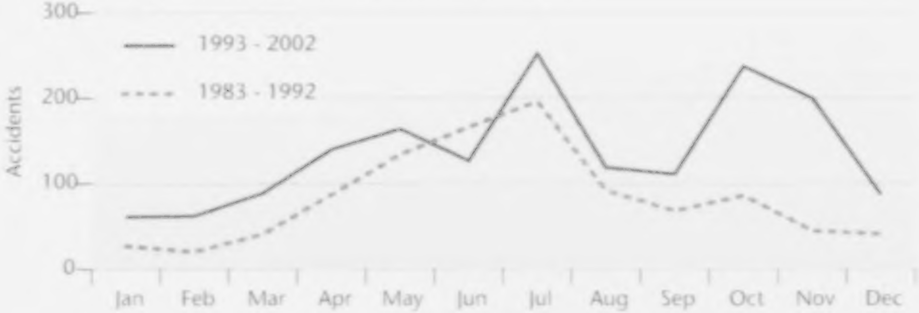


Figure 7.3.4.7 – District 6: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

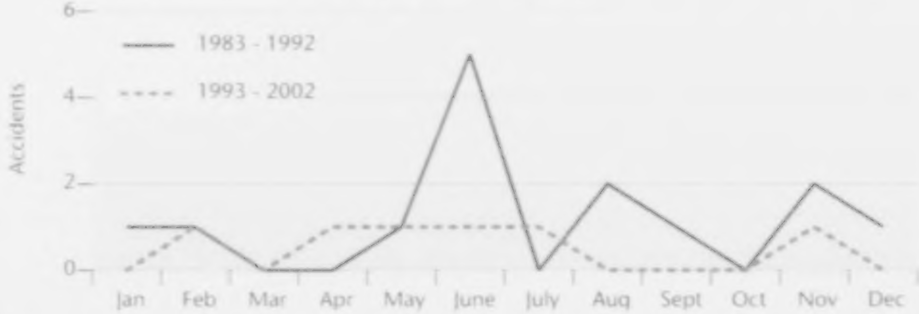


Figure 7.3.4.8 – District 6: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

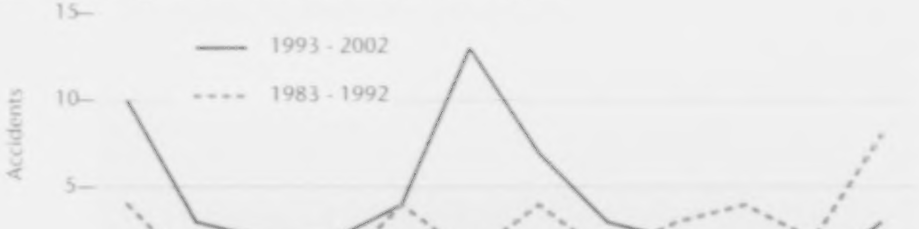


Figure 7.3.4.9 – District 6: Total Annual Coyote Accidents, (1983 to 2002)

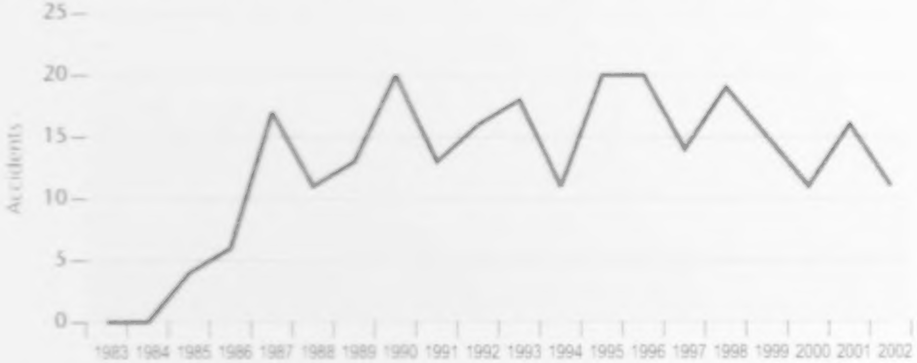
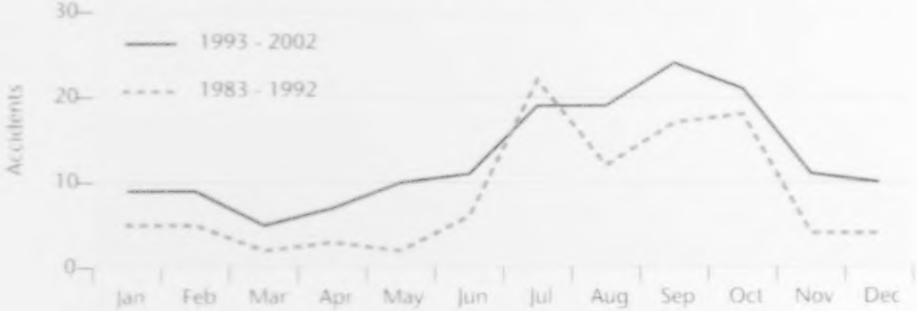


Figure 7.3.4.10 – District 6: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.3.5 District 7 - Cariboo

Map 7.7

Cariboo District

1. Geographic Size

This District is approximately 116,000 km^2 in size

2. Geoclimatic Characteristics

This District has the widest range of geoclimatic variation. It stretches from the Pacific Ocean to the Rocky Mountains, resulting in many types of ecosystems being represented.

At the western portion, at the Pacific Ocean, northern latitude rainforests occur. Western hemlock and amabilis fir are the dominant climax trees. Abundant precipitation, primarily rainfall, and mild temperatures make the forests some of the most productive in the Province. In the drier parts, old-growth Douglas Fir can approach 100 metres in height, while on floodplains, Western Red Cedar and Sitka Spruce can grow up to four metres in diameter. Mature stands of timber provide valuable habitat for black-tailed deer. At higher elevations, where the growing season is short, forest productivity is reduced. Mountain Hemlock and Amabilis Fir are the dominant tree species.

Away from the coast, at the highest elevations of the Coast and Chilcotin mountain ranges, the alpine in the is essentially treeless. The long, cold winters and short, cool growing season result in a landscape covered in draft shrubs, herbs, lichens and mosses. These areas provide important range for caribou, mountain goats and mountain sheep.

Further east, the plateaus at the higher elevations experience cold winters and moderately short and warm summers. The common tree species are Engelmann and hybrid spruce, and Subalpine Fir. Successional forests of Lodgepole Pine, Douglas Fir and Trembling Aspen are the result of past wildfires. These areas provide important summer and fall forage for mule deer.

Northeast, toward the Chilcotin River, the landscape is rolling with numerous scattered wetlands providing excellent wildlife habitat. The area is characterized by many even-aged Lodgepole Pine forest that have resulted from many previous wildfires. Feathermosses and/or lichens tend to dominate the understory, while Pinegrass and Kinnikinnick are also common. In the drier parts, the profuse ground lichens provide valuable winter forage for caribou.

The lower elevations of the valleys in this District are some of the hottest and driest regions of the British Columbia southern interior. Trees are scarce, and Bluebunch Wheatgrass is the dominant species, while Sagebrush is not uncommon. Although the extremely dry climate restricts their growth, Ponderosa Pine and Douglas Fir occasionally occur in depressions and on coarser textured soils. The grassland provides critical winter and spring forage for bighorn sheep and white-tailed deer.

Immediately above the grasslands, Douglas Fir tends to be the dominant species. Where frequent wildfires have occurred, even-aged Ponderosa Pine forests occur at lower elevations while even-aged Lodgepole Pine forests can be found at higher elevations. The understory is dominated by Feathermoss and Pinegrass with Soopolalie and Kinnikinnick being common shrubs. At the drier locations, the landscape becomes savannah-like with bunchgrasses including Bluebunch Wheatgrass and Rough Fescue providing important summer habitat for mule deer and elk.

At higher elevations in the valleys, the plateau areas experience cold winters and moderately short and warm summers. The common tree species are Engelmann and hybrid spruce, and Subalpine Fir. Successional forests of Lodgepole Pine, Douglas Fir and Trembling Aspen are the result of past wildfires. These areas provide important summer and fall forage for mule deer. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 1, 20, 24, 26, 97, and 99.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.3.5.1 – District 7: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
1	4	4	12	8	10	0	8	22	16	22	12	42	40	22	10	24	10	8	2	4	280
20	13	15	14	9	13	2	39	44	33	25	32	49	28	25	56	39	37	53	32	55	613
24	3	4	4	6	5	13	14	16	9	14	22	17	11	19	17	28	23	15	21	10	271
26	4	6	5	7	4	2	0	0	0	0	5	14	3	16	13	9	7	3	9	14	121
97	42	48	42	46	37	78	78	91	87	71	217	162	165	258	243	328	287	228	328	348	3,184
99	0	0	0	0	0	0	0	0	0	0	8	8	5	0	1	1	2	0	0	1	26
Other	27	30	22	15	6	11	14	36	44	36	72	75	81	57	95	89	94	64	50	97	**1,015**
Totals	93	107	99	91	75	106	153	209	189	168	368	367	333	397	435	518	460	371	442	529	**5,510**

Table 7.3.5.2 – District 7: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	4	0	1	6	4	1	1	0	5	1	11	7	14	17	5	8	16	5	6	14	126
Beaver	0	0	2	0	0	3	2	2	1	0	1	0	1	2	0	0	0	0	0	1	15
Bobcat	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	3	0	0	6
Caribou	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Cougar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Coyote	5	12	1	2	1	3	1	5	4	3	14	6	8	10	11	10	3	7	3	6	115
Deer	66	76	62	57	50	83	133	169	137	133	290	278	265	297	365	432	378	300	363	458	4,392
Elk	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
Fox	0	0	1	0	1	0	1	3	2	0	3	3	0	0	2	0	3	4	4	0	27
Horse	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Moose	15	16	21	18	9	16	10	13	22	11	27	42	20	53	44	51	53	38	54	39	572
Muskrat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Otter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Porcupine	0	0	2	4	3	0	1	4	5	3	11	0	1	1	0	0	0	0	0	0	35
Sheep	1	0	0	0	1	0	0	2	4	5	4	10	3	6	0	5	0	2	0	0	43
Skunk	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	1	1	6
Other/ Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	8	7	22
TOTALS	91	105	93	87	70	106	149	198	181	157	362	346	313	386	430	506	455	367	441	527	5,370

Table 7.3.5.3 – District 7: Species Comparisons by Time Series (1983 To 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Bear	126	2.3	6.3	23	1.9	2.3	103	2.5	10.3	49	2.1	9.8	14	2.7
Beaver	15	0.3	0.8	10	0.8	1	5	0.1	0.5	1	0	0.2	1	0.2
Bobcat	6	0.1	0.3	3	0.2	0.3	3	0.1	0.3	3	0.1	0.6	0	0
Caribou	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Cougar	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Coyote	115	2.1	5.8	37	3	3.7	78	1.9	7.8	29	1.3	5.8	6	1.1
Deer	4,392	81.8	219.6	966	78.1	96.6	3,426	82.9	342.6	1,931	84.1	386.2	458	86.9
Elk	5	0.1	0.3	3	0.2	0.3	2	0	0.2	2	0.1	0.4	1	0.2
Fox	27	0.5	1.4	8	0.6	0.8	19	0.5	1.9	11	0.5	2.2	0	0
Horse	1	0	0.1	1	0.1	0.1	0	0	0	0	0	0	0	0
Lynx	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Moose	572	10.7	28.6	151	12.2	15.1	421	10.2	42.1	235	10.2	47	39	7.4
Muskrat	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Otter	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Porcupine	35	0.7	1.8	22	1.8	2.2	13	0.3	1.3	0	0	0	0	0
Sheep	43	0.8	2.2	13	1.1	1.3	30	0.7	3	7	0.3	1.4	0	0
Skunk	6	0.1	0.3	0	0	0	6	0.1	0.6	4	0.2	0.8	1	0.2
Wolf	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other / Unknown	22	0.4	1.1	0	0	0	22	0.5	2.2	22	1	4.4	7	1.3
TOTALS	5,370	100	268.5	1,237	100	123.7	4,133	100	413.3	2,296	100	459.2	527	100

Figure 7.3.5.1 - District 7: Total Annual Bear Accidents, (1983 to 2002)

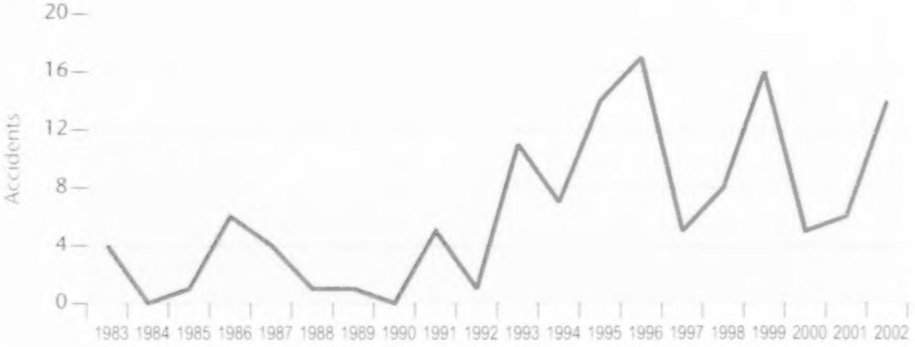


Figure 7.3.5.2 - District 7: Total Annual Deer Accidents, (1983 to 2002)

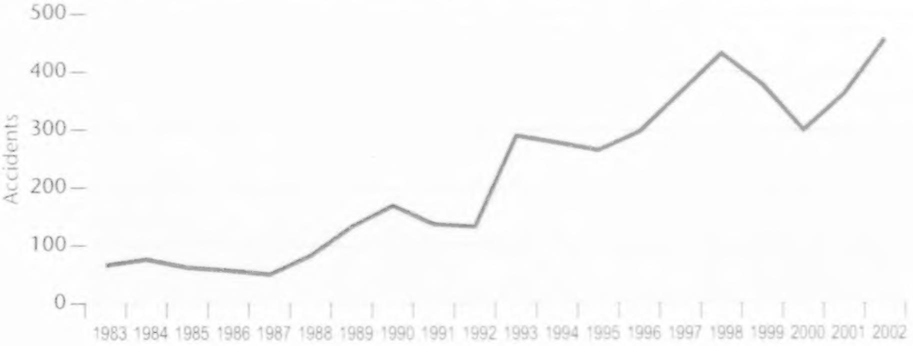


Figure 7.3.5.3 - District 7: Total Annual Elk Accidents, (1983 to 2002)

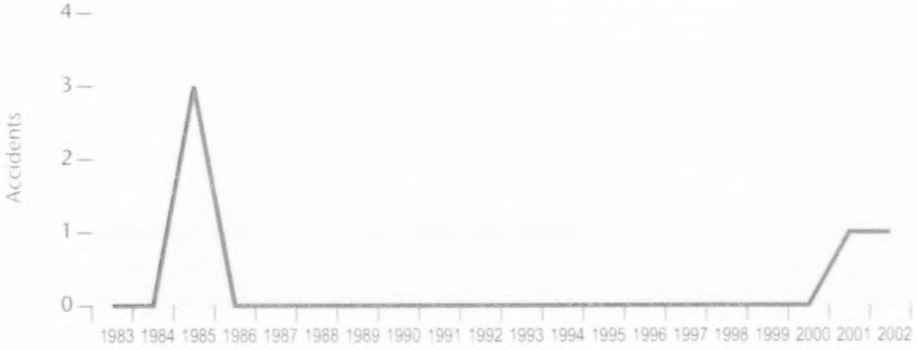


Figure 7.3.5.4 - District 7: Total Annual Moose Accidents, (1983 to 2002)

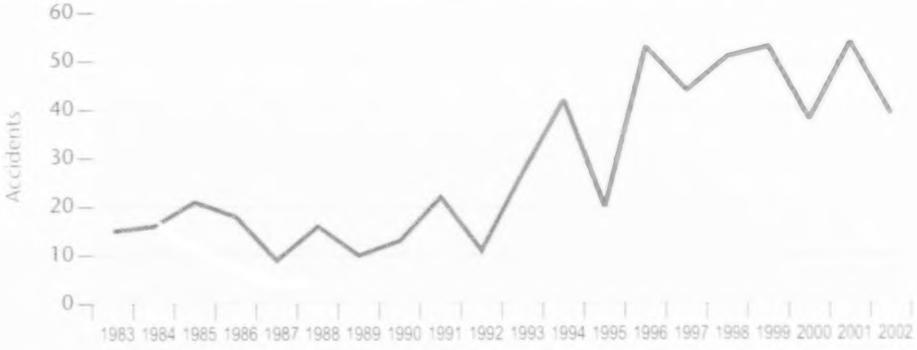


Figure 7.3.5.5 - District 7: Total Monthly Bear Accidents, (1983 to 2002)

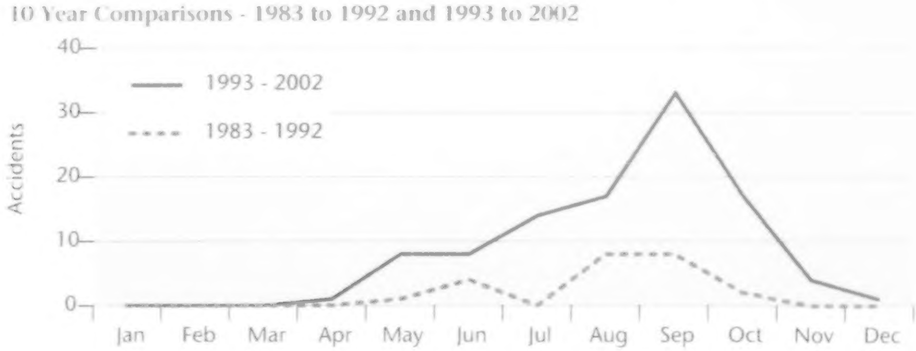


Figure 7.3.5.6 - District 7: Total Monthly Deer Accidents, (1983 to 2002)

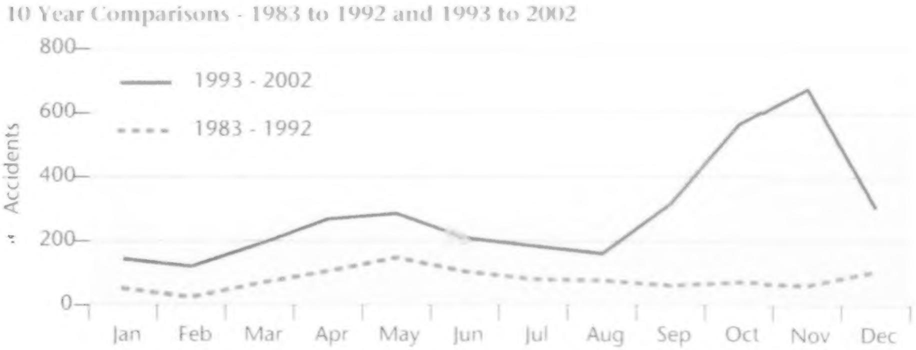


Figure 7.3.5.7 - District 7: Total Monthly Elk Accidents, (1983 to 2002)

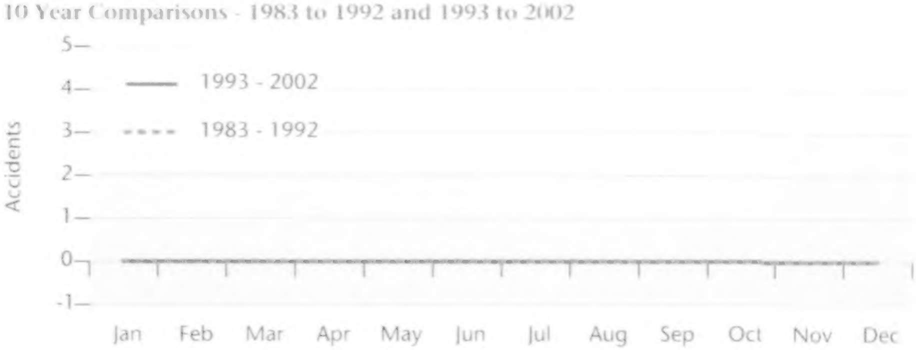


Figure 7.3.5.8 - District 7: Total Monthly Moose Accidents, (1983 to 2002)

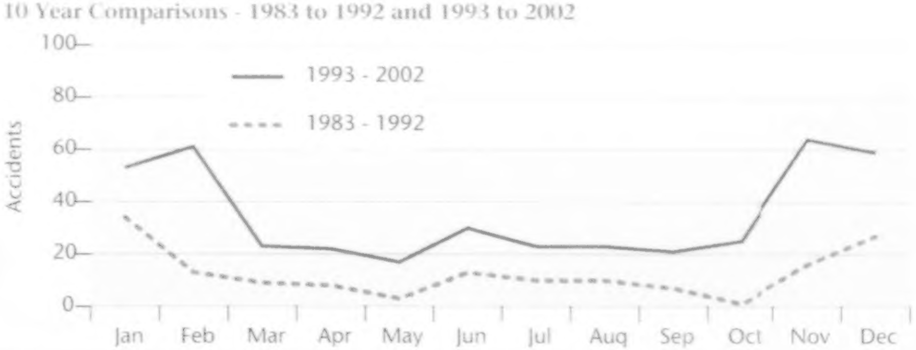


Figure 7.3.5.9 – District 7: Total Annual Coyote Accidents, (1983 to 2002)

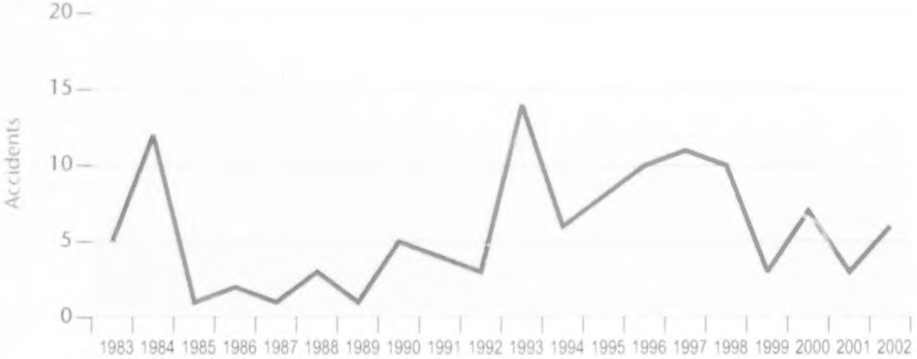
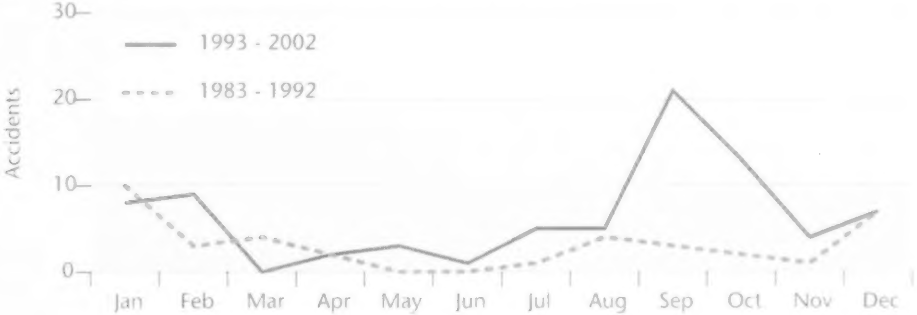


Figure 7.3.5.10 – District 7: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.4 REGION 3 – NORTHERN REGION

7.4.1 District 8 – Peace River District

Map 7.8

Peace District

1. Geographic Size

This District is approximately 186,900 km^2 in size

2. Geoclimatic Characteristics

The majority of this District consists of boreal coniferous forest. The gently rolling terrain is part of the Great Plains. The winters are long and cold. The ground remains frozen for much of the year and the growing season is very short. Numerous fires have resulted in extensive forests of Aspen and Lodgepole Pine. Where flat, the land is a mosaic of Black Spruce bogs and White Spruce and Trembling Aspen stands (British Columbia Ministry of Forests, 1999). The District has considerable rich agricultural land and moose are abundant.

In the northwestern corner of this District, open forests of White Spruce and Subalpine Fir characterize the landscape. Higher elevations are dominated by Scrub Birch and Willow. In some wide, open valleys, a mosaic of scrub, grassland, and wetland occur on the valley bottoms fringed by a band of forest on the valley sides, followed by shrubs above the forest. The portion of the District provides extensive habitat for moose, caribou, and elk. At the highest elevations, of the Coast and Cassiar mountain ranges, the alpine is essentially treeless. The long, cold winters and short, cool growing season result in a landscape covered in draft shrubs, herbs, lichens and mosses. These areas provide important range for caribou, mountain goats and mountain sheep.

The southwestern corner of this District is characterized by the severe climate, with long cold winters and short cool summers. Only trees capable of tolerating extended periods of frozen ground survive here. The landscape is open parkland, with groupings of trees interspersed with meadow, heath and grassland. The common dominant tree species are Engelmann Spruce, Subalpine Fir and Lodgepole Pine. False Azalea and Rhododendron are common understory shrubs. At drier locations, extensive Lodgepole Pine and Whitebark Pine forests can be found. Where snowfall is greater and the soils are wetter, Mountain Hemlock is the common dominant species (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 2, 29, 49, 52, and 97.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.4.1.1 – District 8: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
2	0	1	0	4	9	4	11	8	15	11	53	54	57	37	37	69	42	33	13	30	488
29	2	4	8	16	24	9	42	87	63	51	121	127	130	56	52	110	63	74	41	84	1,164
49	0	0	0	1	5	1	12	7	4	7	13	26	66	23	31	32	17	19	11	10	285
52	0	0	0	0	0	0	0	3	0	17	21	12	24	13	13	27	9	18	17	18	192
97	13	21	16	17	27	11	113	135	122	126	197	296	346	147	66	294	330	348	310	305	3,240
Other	2	7	5	4	8	7	29	29	44	44	101	151	94	27	171	60	68	98	100	118	1,167
Totals	17	33	29	42	73	32	207	269	248	256	506	666	717	303	370	592	529	590	492	565	6,536

Table 7.4.1.2 – District 8: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	1	2	0	1	1	0	3	3	1	2	4	5	6	3	3	18	3	3	3	5	67
Beaver	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	5
Caribou	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Caribou	0	0	0	0	0	0	0	0	0	1	0	2	2	1	0	0	0	0	3	1	10
Coyote	0	0	0	0	0	1	2	3	3	7	18	9	8	4	5	12	10	12	9	8	111
Deer	3	13	13	20	41	19	158	189	197	190	354	503	492	200	244	350	347	407	319	379	4,438
Elk	0	0	1	0	1	1	2	2	1	2	3	2	14	1	13	13	8	15	7	9	95
Fox	0	0	0	0	0	0	0	0	2	0	1	0	0	3	0	0	2	1	2	0	11
Horned Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Marten	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Moose	12	17	14	17	20	7	30	63	28	36	61	79	130	50	66	121	110	117	125	123	1,226
Muskrat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Otter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Porcupine	0	0	0	0	1	0	0	0	1	7	10	12	8	3	2	4	4	1	0	3	56
Rabbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Wolf	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	6
Other/ Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	7	6	17
TOTALS	17	32	29	38	64	28	196	261	233	245	453	612	660	266	333	523	487	557	479	535	6,048

Table 7.4.1.3 – District 8: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Bear	67	1.1	3.4	14	1.2	1.4	53	1.1	5.3	32	1.2	6.4	5	0.9
Beaver	5	0.1	0.3	1	0.1	0.1	4	0.1	0.4	4	0.2	0.8	0	0
Caribou	2	0	0.1	2	0.2	0.2	0	0	0	0	0	0	0	0
Caribou	10	0.2	0.5	1	0.1	0.1	9	0.2	0.9	4	0.2	0.8	1	0.2
Coyote	111	1.8	5.6	16	1.4	1.6	95	1.9	9.5	51	2	10.2	8	1.5
Deer	4,438	73.4	221.9	843	73.8	84.3	3,595	73.3	359.5	1,802	69.8	360.4	379	70.8
Elk	95	1.6	4.8	10	0.9	1	85	1.7	8.5	52	2	10.4	9	1.7
Fox	11	0.2	0.6	2	0.2	0.2	9	0.2	0.9	5	0.2	1	0	0
Horned Owl	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Marten	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Moose	1,226	20.3	61.3	244	21.3	24.4	982	20	98.2	596	23.1	119.2	123	23
Muskrat	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	0	0
Otter	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Porcupine	56	0.9	2.8	9	0.8	0.9	47	1	4.7	12	0.5	2.4	3	0.6
Rabbit	1	0	0.1	0	0	0	1	0	0.1	1	0	0.2	1	0.2
Wolf	6	0.1	0.3	1	0.1	0.1	5	0.1	0.5	3	0.1	0.6	0	0
Other / Unknown	17	0.3	0.9	0	0	0	17	0.3	1.7	17	0.7	3.4	6	1.1
TOTALS	6,048	100	302.4	1,143	100	114.3	4,905	100	490.5	2,581	100	516.2	535	100

Figure 7.4.1.1 – District 8: Total Annual Bear Accidents, (1983 to 2002)

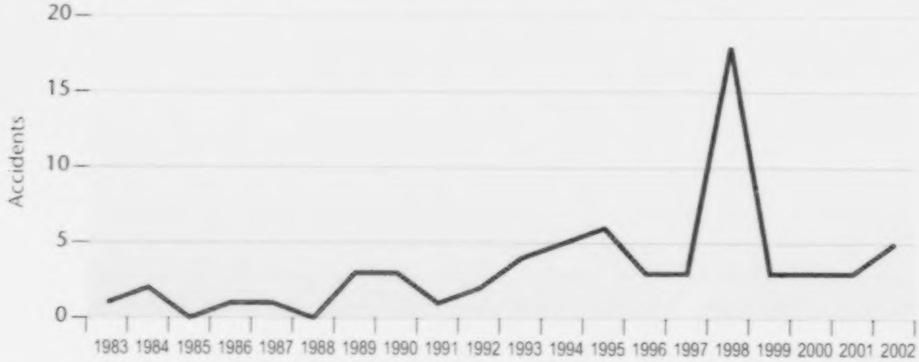


Figure 7.4.1.2 – District 8: Total Annual Deer Accidents, (1983 to 2002)

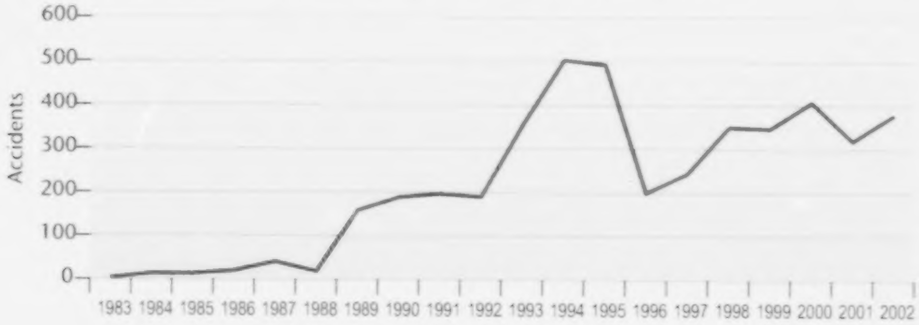


Figure 7.4.1.3 – District 8: Total Annual Elk Accidents, (1983 to 2002)

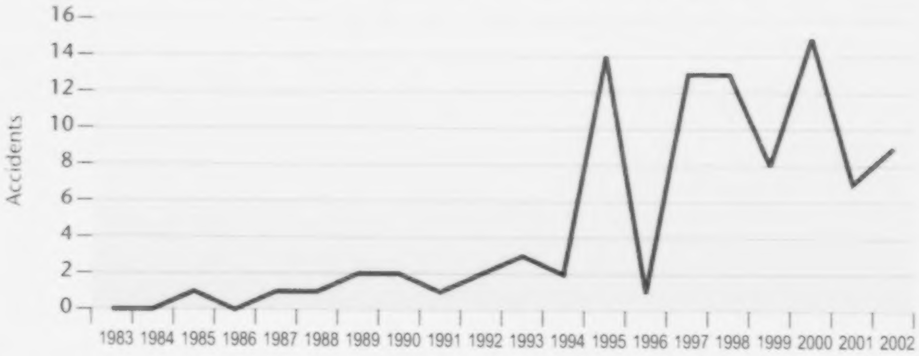


Figure 7.4.1.4 – District 8: Total Annual Moose Accidents, (1983 to 2002)

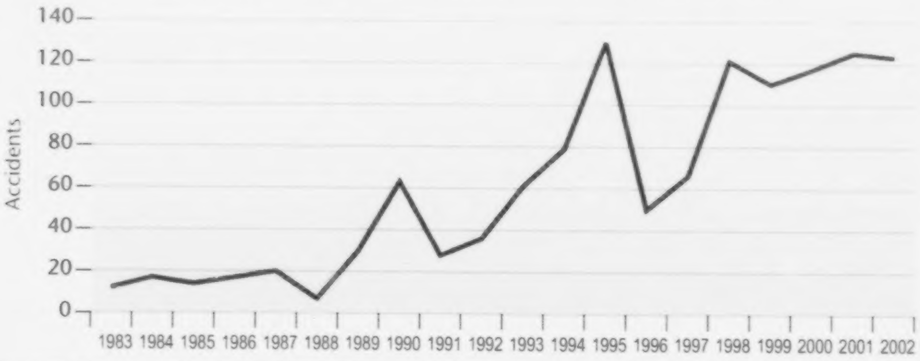


Figure 7.4.1.5 – District 8: Total Monthly Bear Accidents, (1983 to 2002)

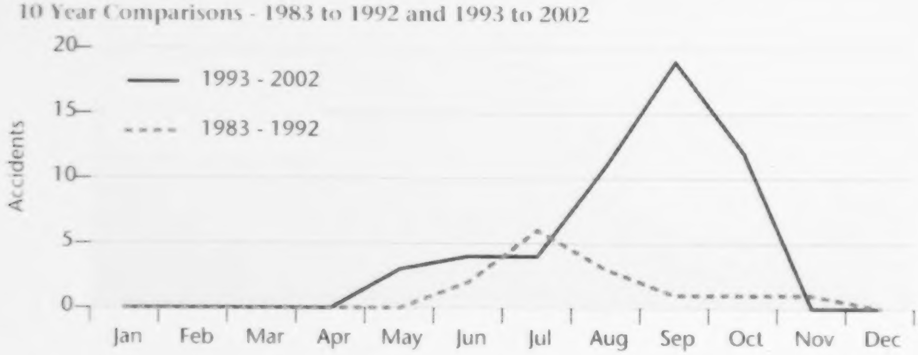


Figure 7.4.1.6 – District 8: Total Monthly Deer Accidents, (1983 to 2002)

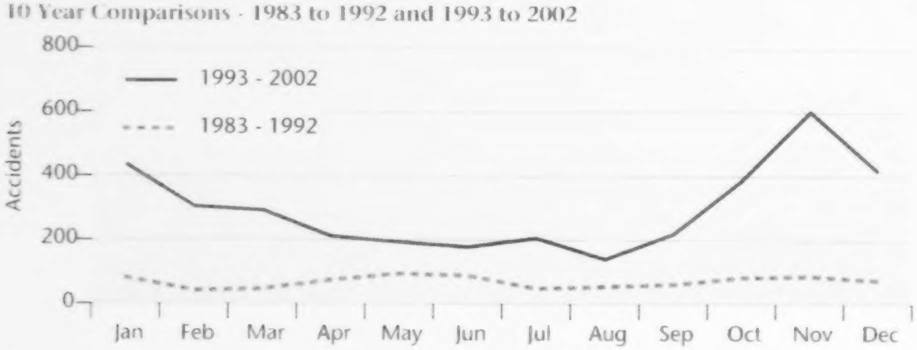


Figure 7.4.1.7 – District 8: Total Monthly Elk Accidents, (1983 to 2002)

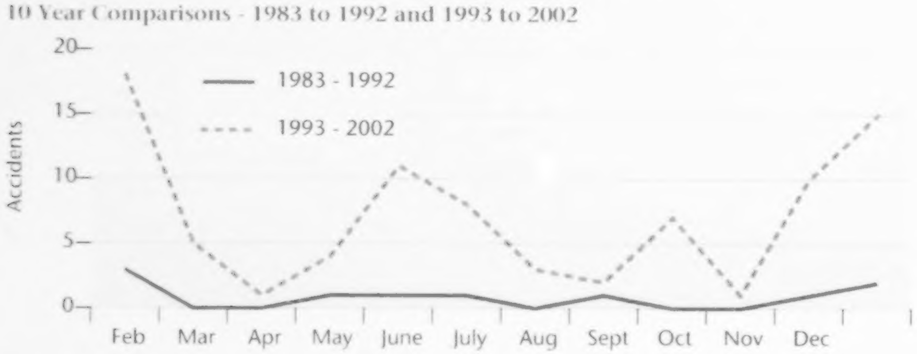


Figure 7.4.1.8 – District 8: Total Monthly Moose Accidents, (1983 to 2002)

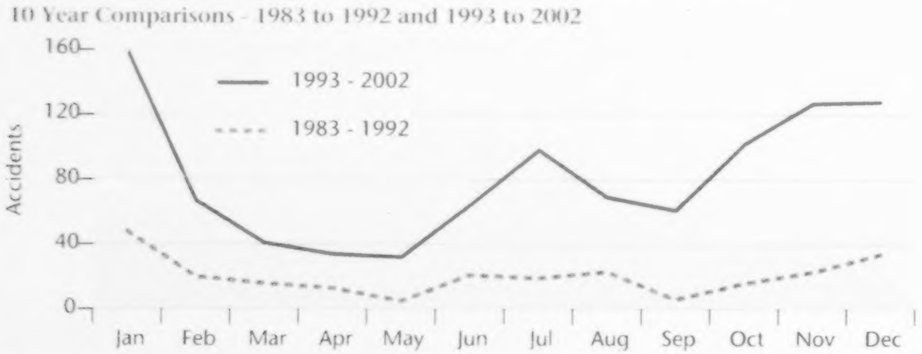


Figure 7.4.1.9 - District 8: Total Annual Coyote Accidents, (1983 to 2002)

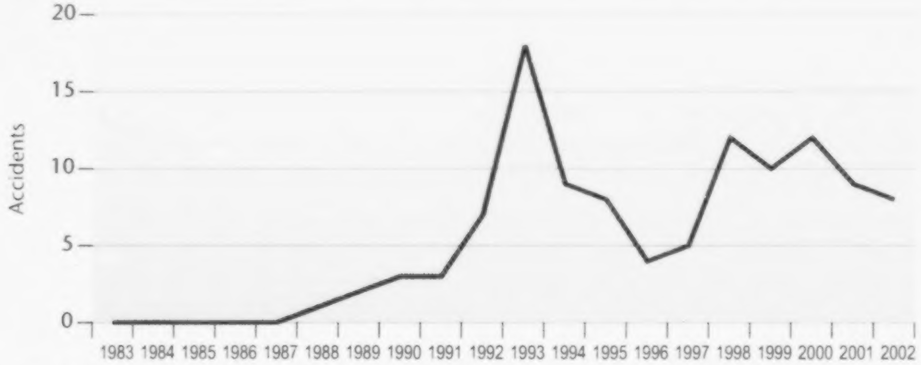
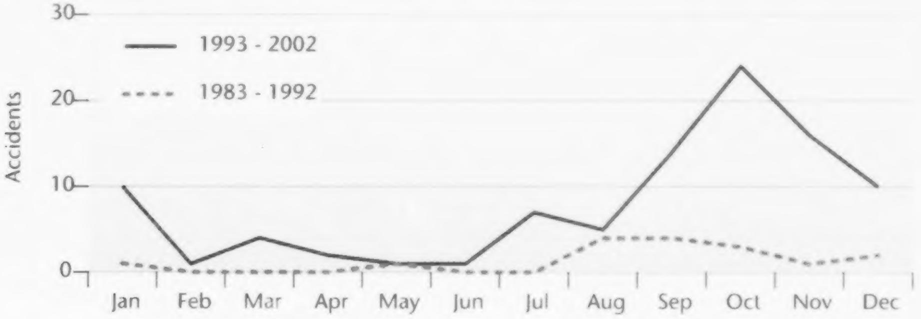


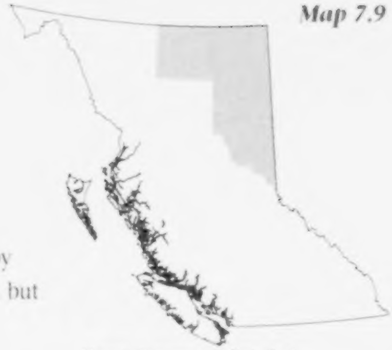
Figure 7.4.1.10 - District 8: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.4.2 District 9 – Fort George

Map 7.9



Fort George District

1. Geographic Size

This District is approximately 153,200 km^2 in size

2. Geoclimatic Characteristics

The southern portion of this District is characterized by gently rolling plateaus. Although the climate is severe, but forest productivity is moderately good. Hybrid Engelmann-White Spruce and Subalpine Fir are the dominant trees. In the drier areas, extensive stands of Lodgepole Pine occur due to numerous previous fires. Wetlands are abundant, scattered across the landscape in areas of poor drainage, providing excellent habitat for moose.

The Omineca Mountains extend into the northern portion of this District. At lower elevations, the landscape is characterized by open forests of White Spruce and Subalpine Fir. Higher elevations are dominated by Scrub Birch and Willow. In some wide, open valleys, a mosaic of scrub, grassland, and wetland occur on the valley bottoms fringed by a band of forest on the valley sides, followed by shrubs above the forest. The portion of the District provides extensive habitat for moose, caribou, and elk. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 5, 16, 27, 39, and 97.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

TABLE 7.4.2.1 – District 9: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
5	14	22	13	31	13	5	17	13	20	42	46	55	37	32	30	36	89	60	65	61	**701**
16	58	50	21	100	28	44	87	97	52	86	140	155	134	88	57	140	150	127	102	103	**1,819**
27	0	0	0	0	0	2	1	1	0	0	3	7	1	3	3	0	0	2	8	0	**31**
39	0	1	2	1	4	0	0	0	1	2	3	0	3	0	0	1	3	2	2	0	**25**
97	17	4	18	19	13	22	27	105	76	21	48	62	37	8	8	26	33	21	31	7	**603**
Other	3	1	1	4	7	7	6	5	9	34	24	33	21	5	39	20	29	10	43	10	**311**
Totals	**92**	**78**	**55**	**155**	**65**	**80**	**138**	**221**	**158**	**185**	**264**	**312**	**233**	**136**	**137**	**223**	**304**	**222**	**251**	**181**	**3,490**

Table 7.4.2.2 – District 9: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	5	1	0	12	6	6	7	10	4	13	22	21	21	9	6	16	18	12	13	9	211
Beaver	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	1	6	1	12
Bobcat	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Caribou	0	0	0	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	5
Cougar	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Coyote	0	0	0	0	0	0	1	4	2	7	2	12	7	4	7	5	8	7	2	2	70
Deer	15	14	5	29	10	4	27	27	23	48	91	83	69	61	64	85	132	106	132	83	1,108
Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Elk	0	0	0	2	0	0	1	1	2	3	1	4	2	4	1	3	3	3	1	1	32
Fox	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	4	2	1	9
Moose	72	63	50	105	49	68	101	91	69	83	104	145	126	57	55	105	135	88	88	79	1,733
Porcupine	0	0	0	5	0	0	1	88	57	29	41	42	4	0	4	7	7	0	1	4	290
Rabbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Raccoon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Skunk	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Wolf	0	0	0	0	0	1	0	0	0	1	0	1	2	1	0	0	1	0	4	0	11
Other/ Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
TOTALS	**92**	**78**	**55**	**155**	**65**	**80**	**138**	**221**	**158**	**185**	**264**	**312**	**233**	**136**	**137**	**223**	**304**	**222**	**251**	**181**	**3,490**

Table 7.4.2.3 – District 9: Species Comparisons by Time Series (1983 to 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Bear	211	6	10.6	64	5.2	6.4	147	6.5	14.7	68	5.8	13.6	9	5
Beaver	12	0.3	0.6	1	0.1	0.1	11	0.5	1.1	8	0.7	1.6	1	0.6
Bobcat	2	0.1	0.1	0	0	0	2	0.1	0.2	0	0	0	0	0
Caribou	5	0.1	0.3	3	0.2	0.3	2	0.1	0.2	1	0.1	0.2	1	0.6
Cougar	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Coyote	70	2	3.5	14	1.1	1.4	56	2.5	5.6	24	2	4.8	2	1.1
Deer	1,108	31.7	55.4	202	16.5	20.2	906	40	90.6	538	45.6	107.6	83	45.9
Eagle	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	0	0
Elk	32	0.9	1.6	9	0.7	0.9	23	1	2.3	11	0.9	2.2	1	0.6
Fox	9	0.3	0.5	1	0.1	0.1	8	0.4	0.8	7	0.6	1.4	1	0.6
Moose	1,733	49.7	86.7	751	61.2	75.1	982	43.4	98.2	495	41.9	99	79	43.6
Porcupine	290	8.3	14.5	180	14.7	18	110	4.9	11	19	1.6	3.8	4	2.2
Rabbit	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	0	0
Raccoon	1	0	0.1	0	0	0	1	0	0.1	1	0.1	0.2	0	0
Skunk	1	0	0.1	0	0	0	1	0	0.1	0	0	0	0	0
Wolf	11	0.3	0.6	2	0.2	0.2	9	0.4	0.9	5	0.4	1	0	0
Other / Unknown	2	0.1	0.1	0	0	0	2	0.1	0.2	2	0.2	0.4	0	0
TOTALS	3,490	100	174.5	1,227	100	122.7	2,263	100	226.3	1,181	100	236.2	181	100

Figure 7.4.2.1 - District 9: Total Annual Bear Accidents, (1983 to 2002)

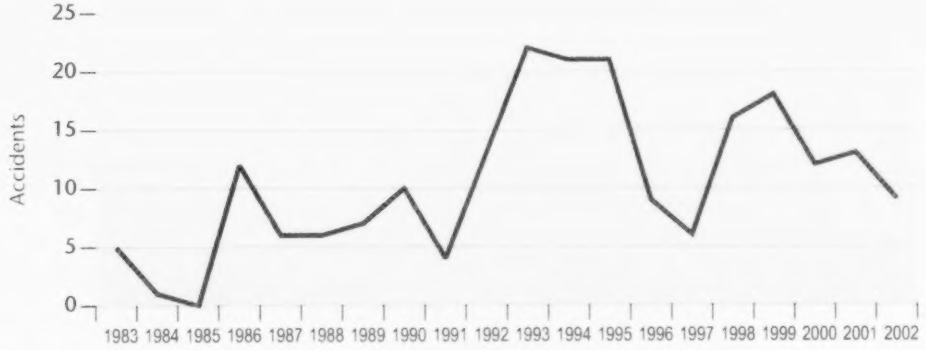


Figure 7.4.2.2 - District 9: Total Annual Deer Accidents, (1983 to 2002)

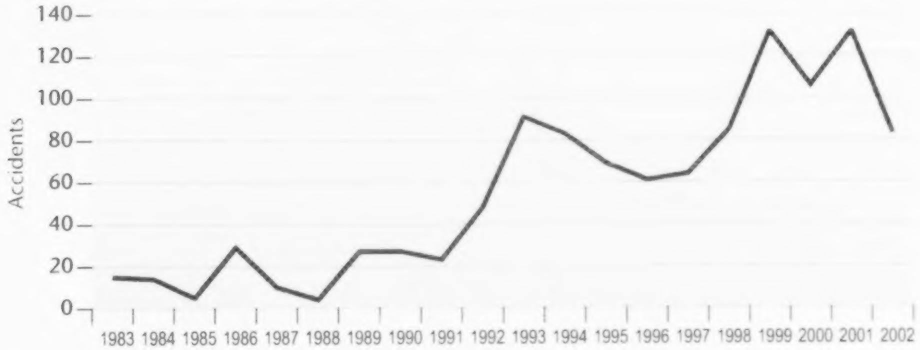


Figure 7.4.2.3 - District 9: Total Annual Elk Accidents, (1983 to 2002)

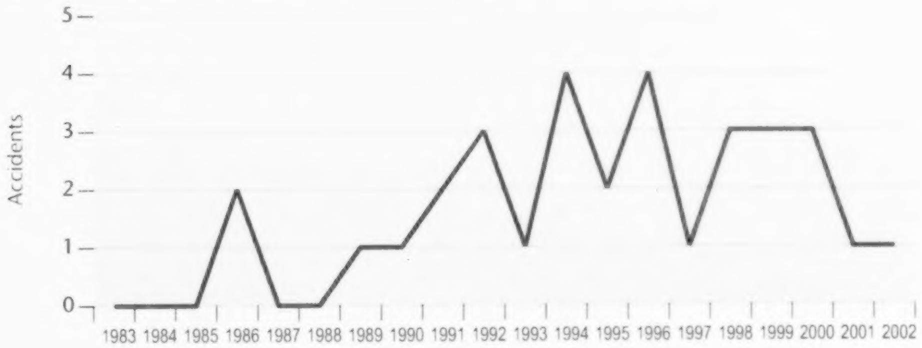


Figure 7.4.2.4 - District 9: Total Annual Moose Accidents, (1983 to 2002)

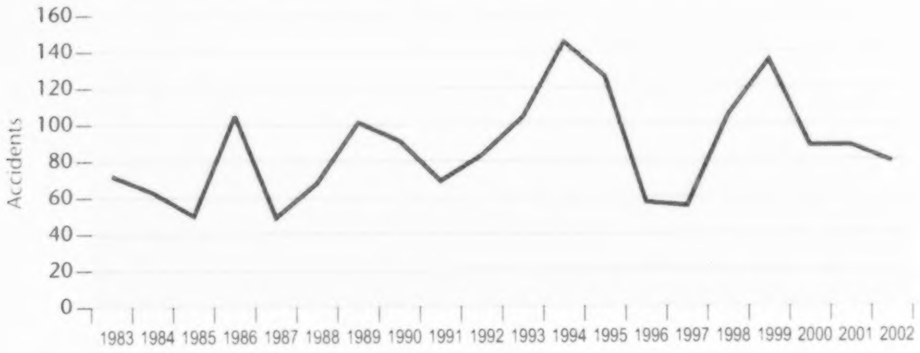


Figure 7.4.2.5 – District 9: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

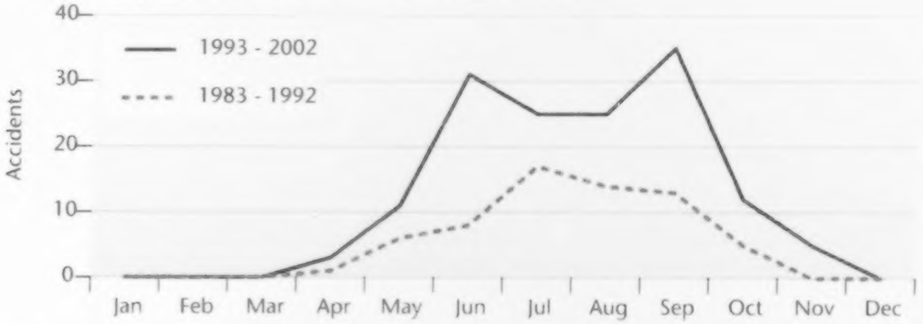


Figure 7.4.2.6 – District 9: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

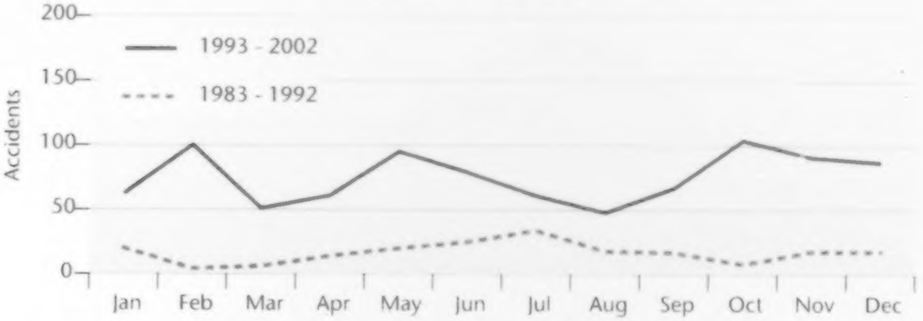


Figure 7.4.2.7 – District 9: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

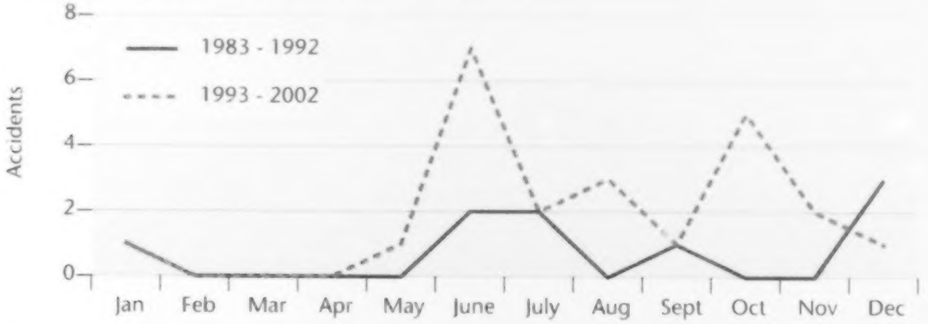


Figure 7.4.2.8 – District 9: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

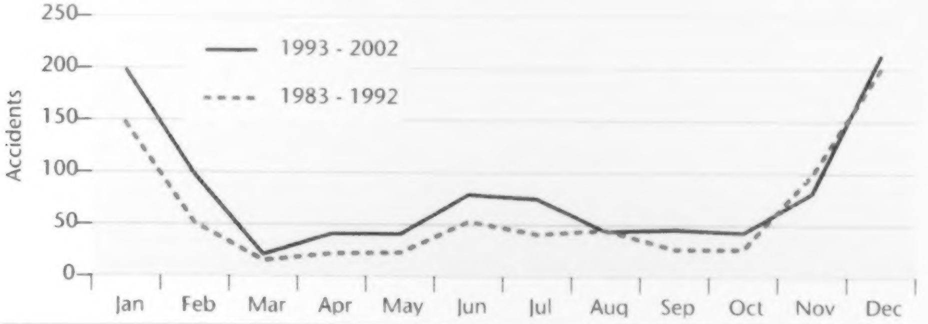


Figure 7.4.2.9 - District 9: Total Annual Coyote Accidents, (1983 to 2002)

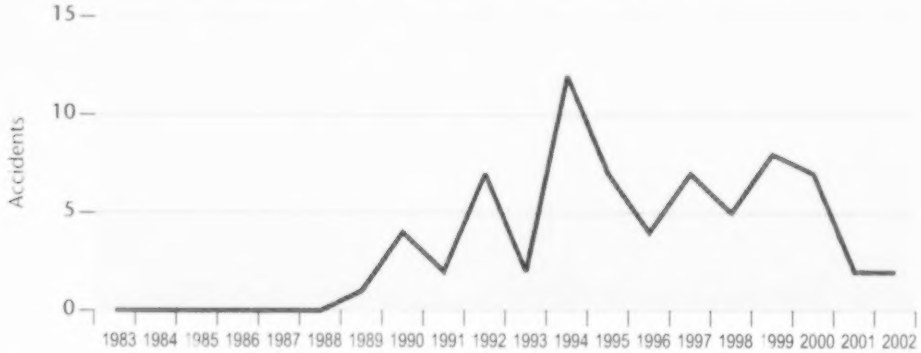
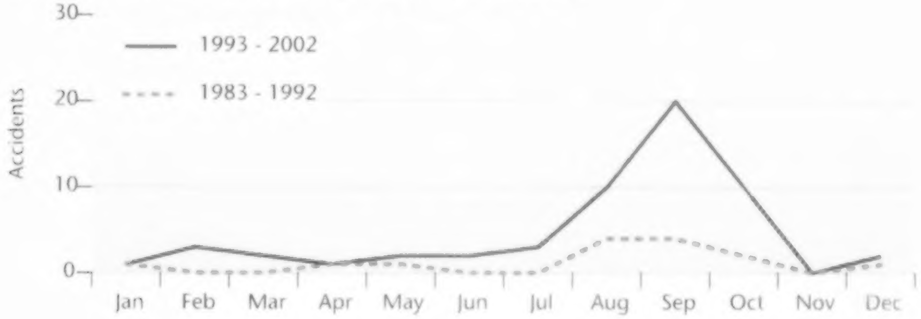


Figure 7.4.2.10 - District 9: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.4.3 District 10 – Bulkley-Stikine

Map 7.10

Bulkley-Stikine District

1. Geographic Size

This District is approximately 201,700 km^2 in size

2. Geoclimatic Characteristics

The southern portion of this District is characterized by gently rolling plateaus. Although the climate is severe, but forest productivity is moderately good. Hybrid Engelmann-White Spruce and Subalpine Fir are the dominant trees. In the drier areas, extensive stands of Lodgepole Pine occur due to numerous previous fires. Wetlands are abundant, scattered across the landscape in areas of poor drainage, providing excellent habitat for moose.

The central portion of this District is one of the most productive in the British Columbia Interior. It has the widest variety of coniferous tree species of any region of the Province. Winters are cool and wet, while summers are usually warm and dry. Although Western Hemlock and Western Red Cedar are characteristic of the area, Engelmann-White Spruce hybrids and Subalpine Fir are common. At drier locations, Douglas Fir and Lodgepole Pine can be found.

The landscape of northern portion of this District is characterized by open forests of White Spruce and Subalpine Fir. Higher elevations are dominated by Scrub Birch and Willow. In some wide, open valleys, a mosaic of scrub, grassland, and wetland occur on the valley bottoms fringed by a band of forest on the valley sides, followed by shrubs above the forest. The portion of the District provides extensive habitat for moose, caribou, and elk. At the highest elevations, of the Coast and Cassiar mountain ranges, the alpine is essentially treeless. The long, cold winters and short, cool growing season result in a landscape covered in draft shrubs, herbs, lichens and mosses. These areas provide important range for caribou, mountain goats and mountain sheep. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 16, 35, 37, 37A and 118.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables.

Table 7.4.3.1 – District 10: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
16	25	55	34	33	38	47	32	49	31	71	94	126	73	78	63	68	87	69	95	83	1,251
35	0	1	1	1	0	4	2	0	4	1	3	8	8	6	0	4	4	4	9	4	64
37	0	0	5	1	7	7	7	92	23	26	22	34	40	21	21	11	32	43	24	18	434
37A	0	0	0	0	0	0	0	0	10	3	4	0	21	8	1	0	3	6	8	4	68
118	0	0	2	1	0	3	1	0	0	0	0	0	4	1	1	2	1	1	2	2	21
Other	5	6	59	2	0	7	6	6	16	16	20	26	25	17	12	8	15	34	17	27	324
Totals	30	62	101	38	45	68	48	147	84	117	143	194	171	131	98	93	142	157	155	138	2,162

Table 7.4.3.2 – District 10: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	2	3	2	1	2	2	6	0	9	8	5	11	11	13	10	6	21	24	26	19	181
Beaver	0	0	0	0	0	0	0	3	0	0	0	0	4	2	0	0	2	1	1	1	14
Bobcat	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
Caribou	0	0	0	0	0	0	0	1	5	3	0	0	3	0	0	0	0	3	0	0	15
Coyote	0	0	0	0	0	0	0	1	0	4	7	2	6	4	3	4	1	5	3	1	41
Deer	7	9	9	14	8	21	9	22	27	33	64	51	44	37	34	40	37	55	39	45	605
Fox	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	3	4	5	1	18
Horse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Marmot	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Marten	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Moose	20	50	35	23	34	37	19	27	17	47	34	98	54	51	43	32	60	45	69	60	855
Porcupine	1	0	55	0	0	8	14	92	24	22	32	31	41	22	7	8	15	15	6	7	400
Wolf	0	0	0	0	1	0	0	1	1	0	0	0	2	1	1	1	1	0	1	2	12
Other/ Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	5	2	13
TOTALS	30	62	101	38	45	68	48	147	84	117	143	194	171	131	98	93	142	157	155	138	2,162

Table 7.4.3.3 – District 10: Species Comparisons by Time Series (1983 To 2002)

SPECIES	83 to 02 Total Accidents	83 to 02 % of Total Accidents	83 to 02 Annual Average Accidents	83 to 92 Total Accidents	83 to 92 % of Total Accidents	83 to 92 Annual Average Accidents	93 to 02 Total Accidents	93 to 02 % of Total Accidents	93 to 02 Annual Average Accidents	98 to 02 Total Accidents	98 to 02 % of Total Accidents	98 to 02 Annual Average Accidents	2002 Total Accidents	2002 Annual % of Total Accidents
Bear	181	8.4	9.1	35	4.7	3.5	146	10.3	14.6	96	14	19.2	19	13.8
Beaver	14	0.6	0.7	3	0.4	0.3	11	0.8	1.1	5	0.7	1	1	0.7
Bobcat	2	0.1	0.1	1	0.1	0.1	1	0.1	0.1	0	0	0	0	0
Caribou	15	0.7	0.8	9	1.2	0.9	6	0.4	0.6	3	0.4	0.6	0	0
Coyote	41	1.9	2.1	5	0.7	0.5	36	2.5	3.6	14	2	2.8	1	0.7
Deer	605	28	30.3	159	21.5	15.9	446	31.4	44.6	216	31.5	43.2	45	32.6
Fox	18	0.8	0.9	0	0	0	18	1.3	1.8	15	2.2	3	1	0.7
Horned Owl	1	0	0.1	0	0	0	1	0.1	0.1	1	0.1	0.2	0	0
Marmot	2	0.1	0.1	0	0	0	2	0.1	0.2	0	0	0	0	0
Marten	3	0.1	0.2	0	0	0	3	0.2	0.3	0	0	0	0	0
Moose	855	39.5	42.8	309	41.8	30.9	546	38.4	54.6	266	38.8	53.2	60	43.5
Porcupine	400	18.5	20	216	29.2	21.6	184	12.9	18.4	51	7.4	10.2	7	5.1
Wolf	12	0.6	0.6	3	0.4	0.3	9	0.6	0.9	5	0.7	1	2	1.4
Other / Unknown	13	0.6	0.7	0	0	0	13	0.9	1.3	13	1.9	2.6	2	1.4
TOTALS	2,162	100	108.1	740	100	74	1,422	100	142.2	685	100	137	138	100

Figure 7.4.3.1 - District 10: Total Annual Bear Accidents, (1983 to 2002)

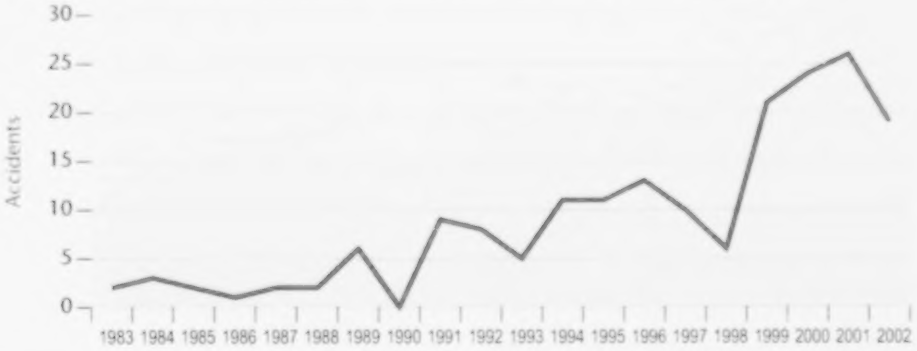


Figure 7.4.3.2 - District 10: Total Annual Deer Accidents, (1983 to 2002)

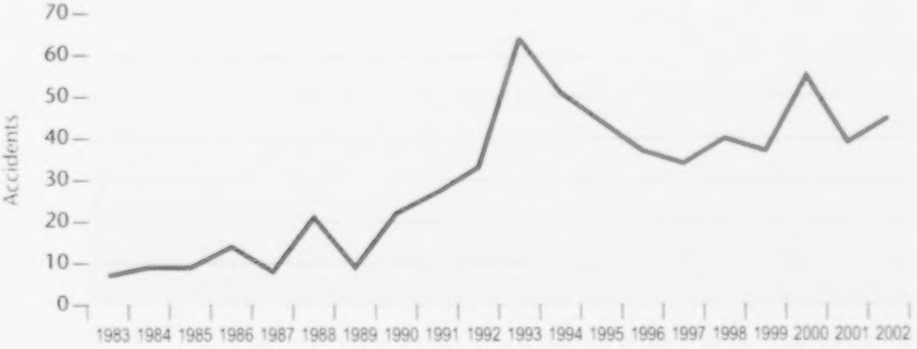


Figure 7.4.3.3 - District 10: Total Annual Elk Accidents, (1983 to 2002)

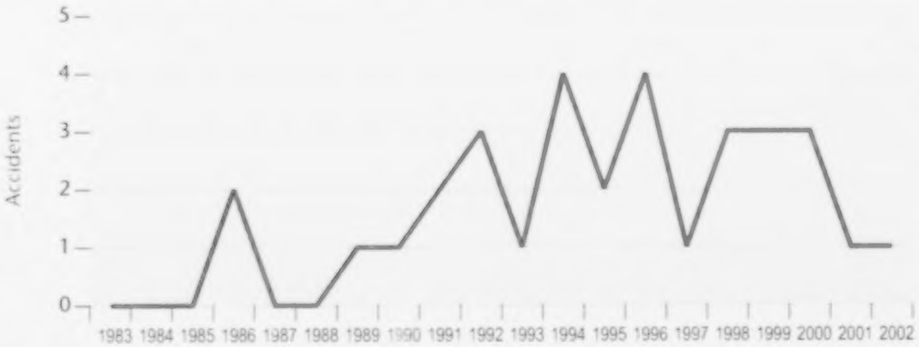


Figure 7.4.3.4 - District 10: Total Annual Moose Accidents, (1983 to 2002)

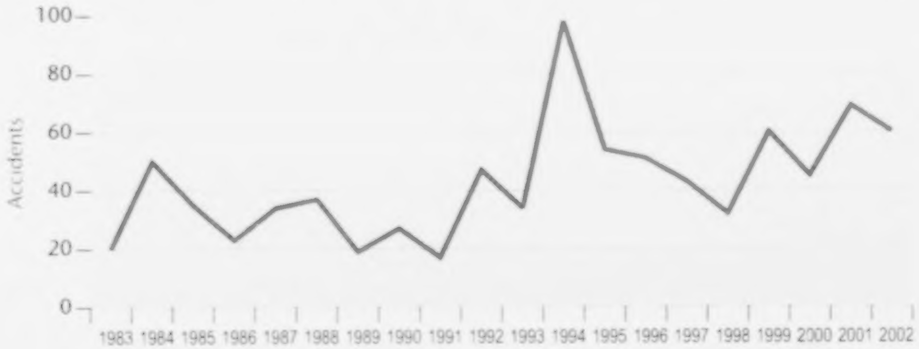


Figure 7.4.3.5 – District 10: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

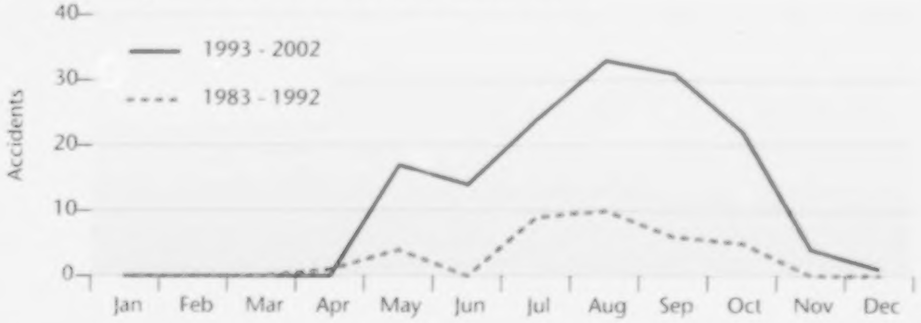


Figure 7.4.3.6 – District 10: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

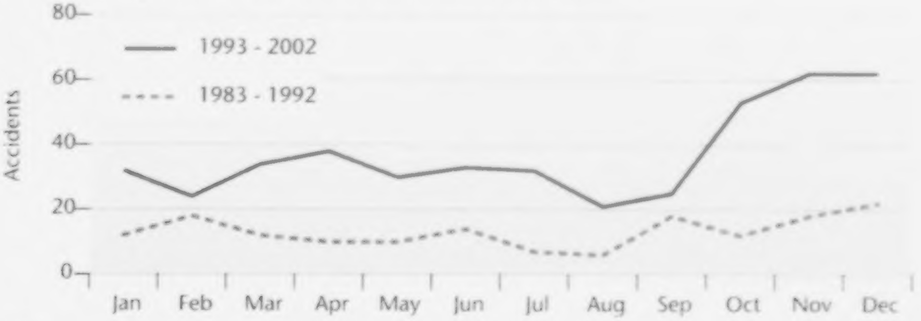


Figure 7.4.3.7 – District 10: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

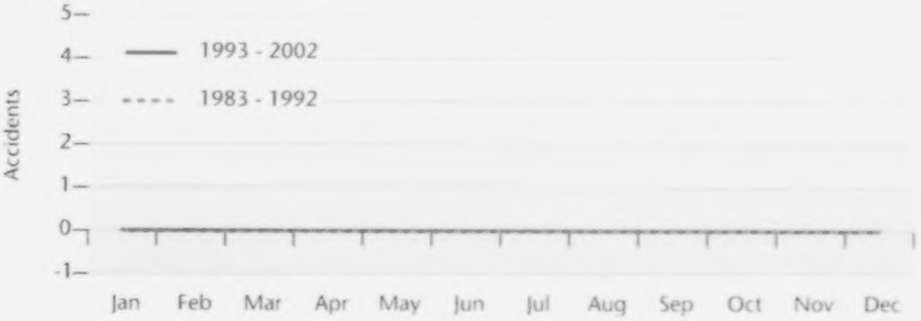


Figure 7.4.3.8 – District 10: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

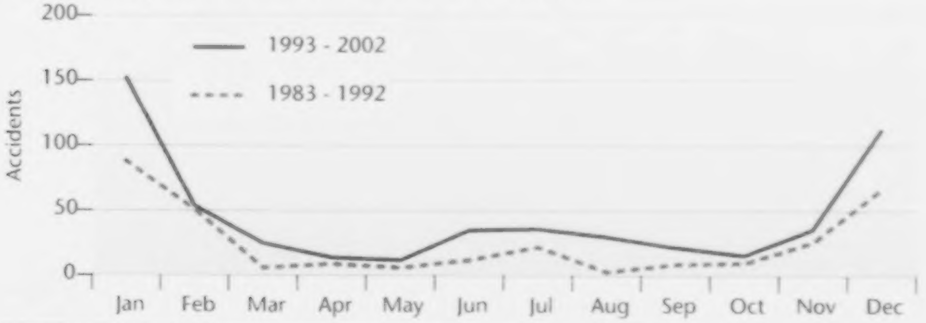


Figure 7.4.3.9 - District 10: Total Annual Coyote Accidents, (1983 to 2002)

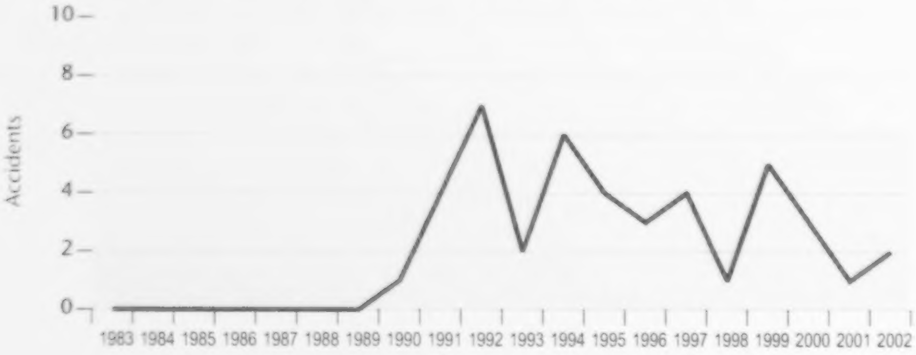


Figure 7.4.3.10 - District 10: Total Monthly Coyote Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

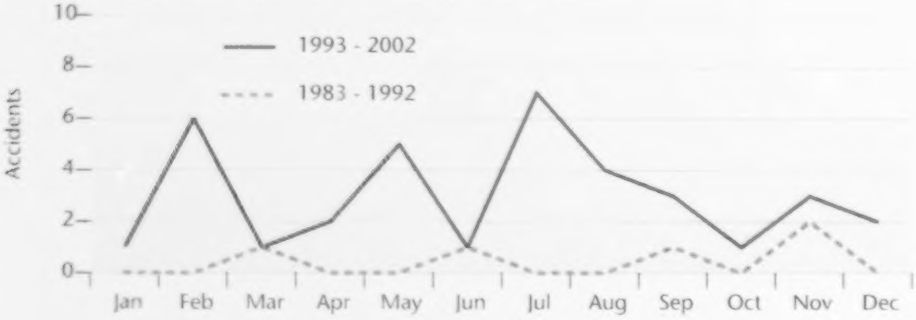


Figure 7.4.3.11 - District 10: Total Annual Porcupine Accidents, (1983 to 2002)

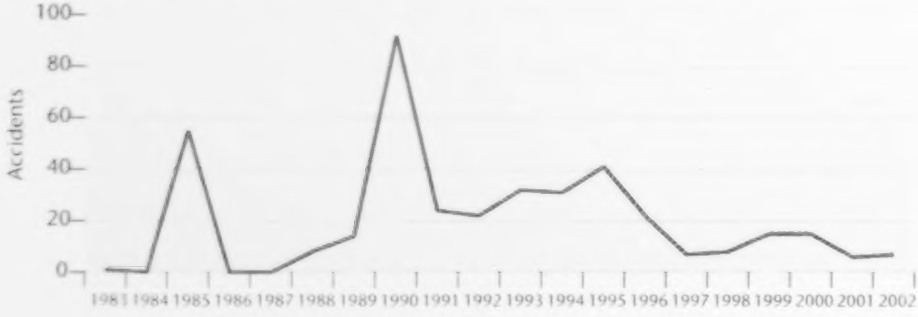
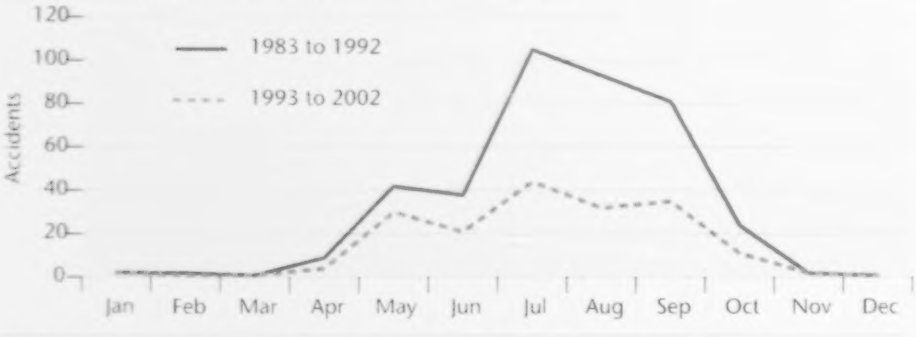


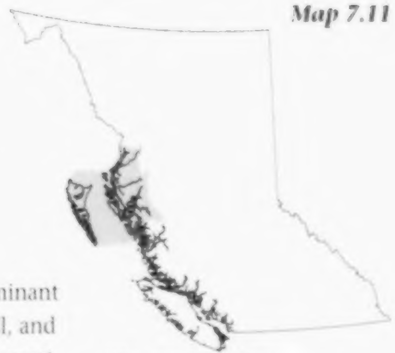
Figure 7.4.3.12 - District 10: Total Monthly Porcupine Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



7.4.4 District 11 - Skeena

Map 7.11



Skeena District

1. Geographic Size

This District is approximately 101,900 km^2 in size

2. Geoclimatic Characteristics

Northern latitude rainforests comprise much of this District. Western hemlock and amabilis fir are the dominant climax trees. Abundant precipitation, primarily rainfall, and mild temperatures make the forests in this District the most productive in British Columbia. In the drier parts, old-growth Douglas Fir can approach 100 metres in height, while on floodplains, Western Red Cedar and Sitka Spruce can grow up to four metres in diameter. Mature stands of timber provide valuable habitat for black-tailed deer. At higher elevations, where the growing season is short, forest productivity is reduced. Mountain Hemlock and Amabilis Fir are the dominant tree species. (Adapted from: British Columbia Ministry of Forests, 1999, Biogeographical Zones of British Columbia.)

3. Highway Information

This District has the following numbered Provincial highways: 16 and 37.

4. Total Wildlife Accidents by Highway

Wildlife accidents on each of the numbered highways in this District for the period 1983 to 2002 are provided in the following tables.

5. Wildlife Accidents by Species

Species specific accidents for this District are provided in the following tables and graphs.

6. Species Comparisons by Time Series

Comparisons by species of 10-year accident trends are provided in the following tables

Table 7.4.4.1 – District 11: Total Wildlife Accidents by Highway (1983 to 2002)

HWY	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994**	1995	1996	1997	1998	1999	2000	2001	2002	Totals
16	0	1	132	45	103	96	78	27	43	10	24	0	14	10	90	81	44	36	25	37	896
37	3	0	8	16	6	0	6	5	26	5	9	0	4	14	22	2	15	4	13	4	162
Other	0	0	21	13	11	14	10	8	37	21	5	0	1	7	7	6	19	24	64	44	312
Totals	3	1	161	74	120	110	94	40	106	36	38	0	19	31	119	89	78	64	102	85	1,370

***Records missing – all 1994 monthly WARS reports*

Table 7.4.4.2 – District 11: Wildlife Accidents by Species (1983 to 2002)

SPECIES	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
Bear	0	1	4	3	6	1	2	4	4	1	0	0	0	1	5	2	1	3	7	3	48
Beaver	0	0	18	1	6	2	2	1	2	0	0	0	0	0	12	3	1	4	0	1	53
Coyote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Deer	0	0	31	15	52	87	38	3	27	2	19	0	1	3	27	37	20	21	19	36	438
Eagle	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Elk	0	0	0	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	0	6
Fisher	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Fox	0	0	0	3	3	1	3	0	3	0	0	0	1	0	1	0	1	0	3	1	20
Marten	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Moose	1	0	3	5	8	0	2	9	14	0	10	0	6	27	17	12	20	1	11	8	154
Muskrat	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Otter	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	3
Porcupine	0	0	103	47	45	18	43	20	54	29	5	0	9	0	53	35	29	30	37	29	586
Rabbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Raccoon	0	0	2	0	0	1	2	0	0	0	2	0	0	0	0	0	0	1	20	1	29
Skunk	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Wolf	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	0	1	6
Other/ Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	5	5	17
TOTALS	3	1	161	74	120	110	94	40	106	36	38	0	19	31	119	89	78	64	102	85	1,370

Table 7.4.4.3 – District 11: Species Comparisons by Time Series (1983 To 2002)

	83 to 02	83 to 02	83 to 02	83 to 92	83 to 92	83 to 92	93 to 02	93 to 02	93 to 02	98 to 02	98 to 02	98 to 02	2002	2002
SPECIES	**Total Accidents**	**% of Total Accidents**	**Annual Average Accidents**	**Total Accidents**	**% of Total Accidents**	**Annual Average Accidents**	**Total Accidents**	**% of Total Accidents**	**Annual Average Accidents**	**Total Accidents**	**% of Total Accidents**	**Annual Average Accidents**	**Total Accidents**	**Annual % of Total Accidents**
Bear	48	3.5	2.4	26	3.5	2.6	22	3.5	2.2	16	3.8	3.2	3	3.5
Beaver	53	3.9	2.7	32	4.3	3.2	21	3.4	2.1	9	2.2	1.8	1	1.2
Coyote	2	0.1	0.1	0	0	0	2	0.3	0.2	2	0.5	0.4	0	0
Deer	438	32	21.9	255	34.2	25.5	183	29.3	18.3	133	31.8	26.6	36	42.4
Eagle	2	0.1	0.1	1	0.1	0.1	1	0.2	0.1	0	0	0	0	0
Elk	6	0.4	0.3	4	0.5	0.4	2	0.3	0.2	0	0	0	0	0
Fisher	1	0.1	0.1	1	0.1	0.1	0	0	0	0	0	0	0	0
Fox	20	1.5	1	13	1.7	1.3	7	1.1	0.7	5	1.2	1	1	1.2
Marten	1	0.1	0.1	1	0.1	0.1	0	0	0	0	0	0	0	0
Moose	154	11.2	7.7	42	5.6	4.2	112	17.9	11.2	52	12.4	10.4	8	9.4
Muskrat	1	0.1	0.1	0	0	0	1	0.2	0.1	0	0	0	0	0
Otter	3	0.2	0.2	2	0.3	0.2	1	0.2	0.1	1	0.2	0.2	0	0
Porcupine	586	42.8	29.3	359	48.2	35.9	227	36.3	22.7	160	38.3	32	29	34.1
Rabbit	2	0.1	0.1	0	0	0	2	0.3	0.2	1	0.2	0.2	0	0
Raccoon	29	2.1	1.5	5	0.7	0.5	24	3.8	2.4	22	5.3	4.4	1	1.2
Skunk	1	0.1	0.1	0	0	0	1	0.2	0.1	0	0	0	0	0
Wolf	6	0.4	0.3	2	0.3	0.2	4	0.6	0.4	2	0.5	0.4	1	1.2
Other / Unknown	17	1.2	0.9	2	0.3	0.2	15	2.4	1.5	15	3.6	3	5	5.9
TOTALS	1,370	100	68.5	745	100	74.5	625	100	62.5	418	100	83.6	85	100

Figure 7.4.4.1 - District 11: Total Annual Bear Accidents, (1983 to 2002)

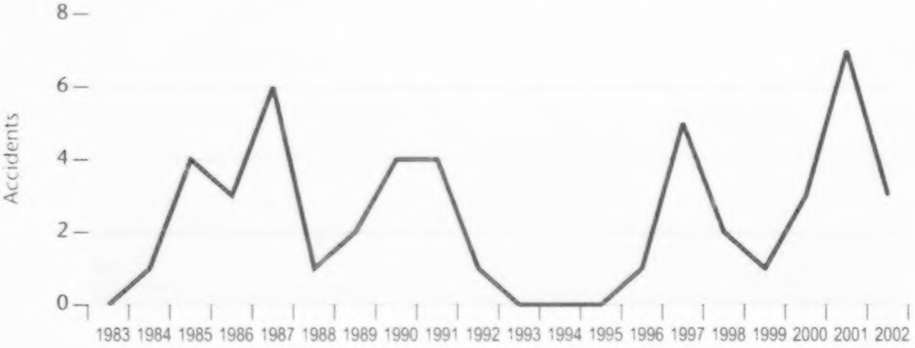


Figure 7.4.4.2 - District 11: Total Annual Deer Accidents, (1983 to 2002)

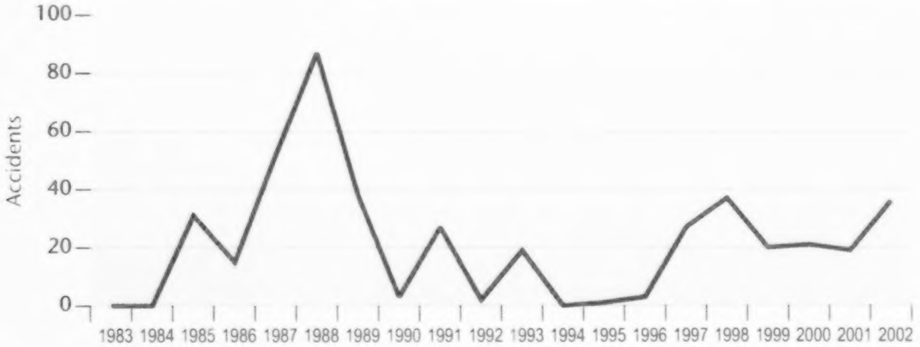


Figure 7.4.4.3 - District 11: Total Annual Elk Accidents, (1983 to 2002)

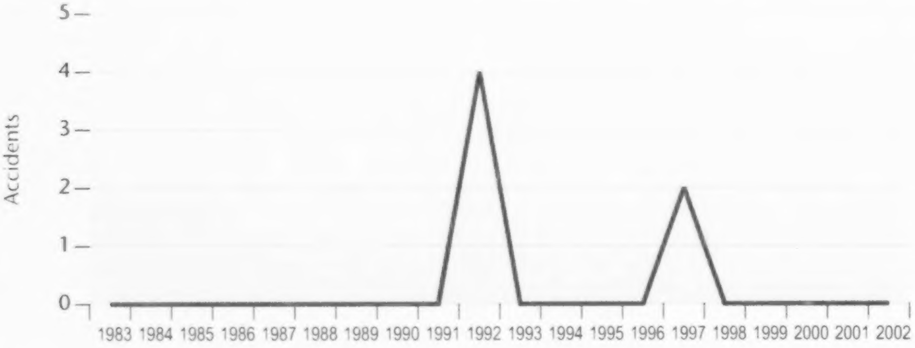


Figure 7.4.4.4 - District 11: Total Annual Moose Accidents, (1983 to 2002)

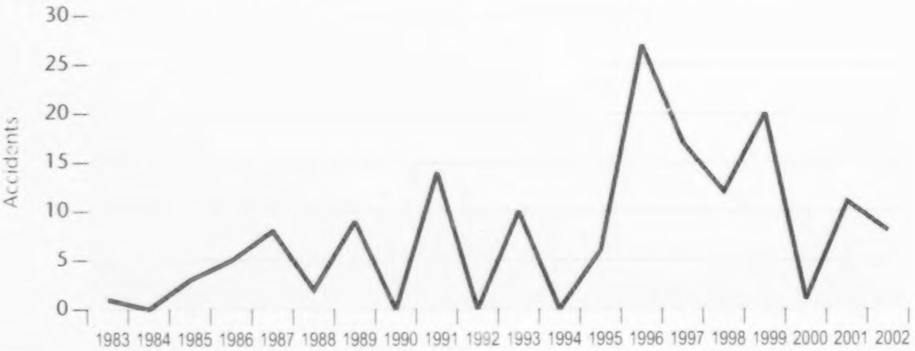


Figure 7.4.4.5 - District 11: Total Monthly Bear Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

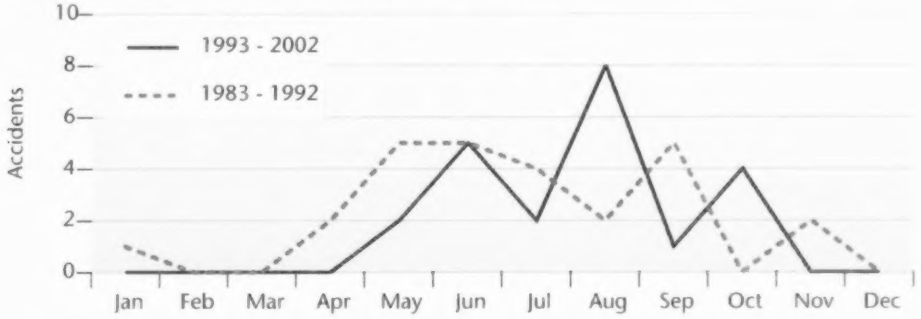


Figure 7.4.4.6 - District 11: Total Monthly Deer Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

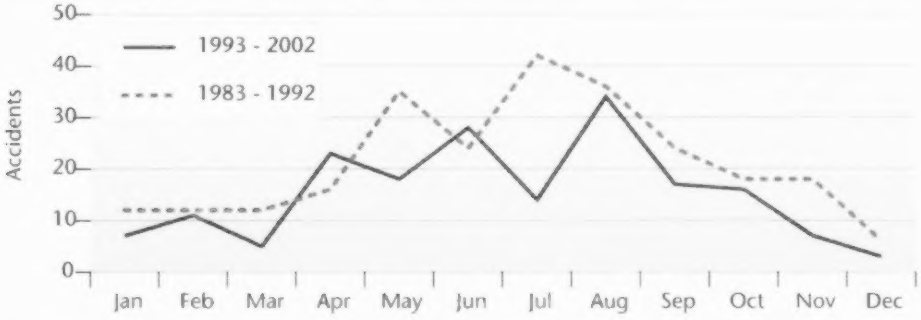


Figure 7.4.4.7 - District 11: Total Monthly Elk Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

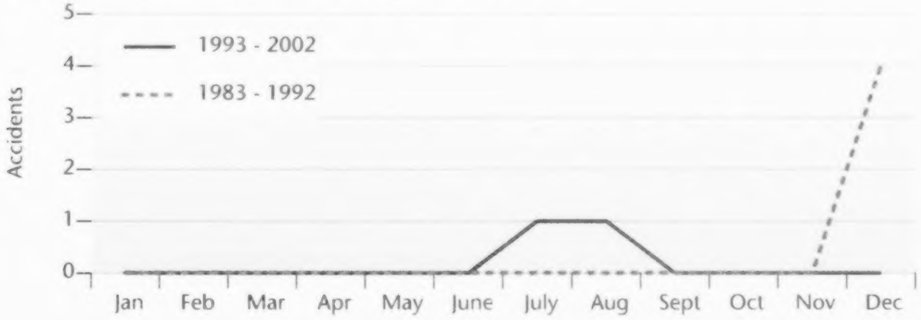


Figure 7.4.4.8 - District 11: Total Monthly Moose Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002

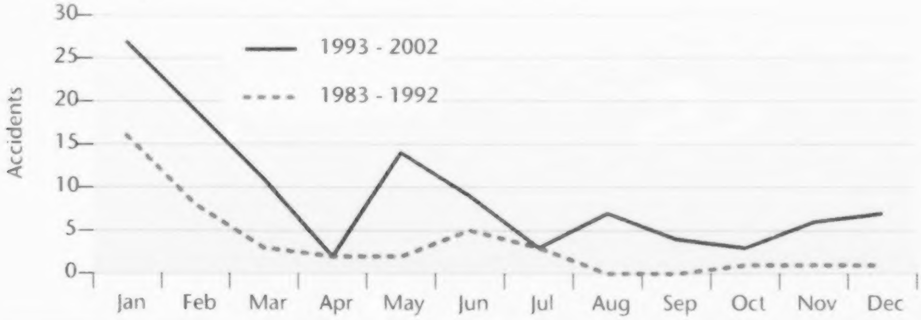


Figure 7.4.4.9 - District 11: Total Annual Porcupine Accidents, (1983 to 2002)

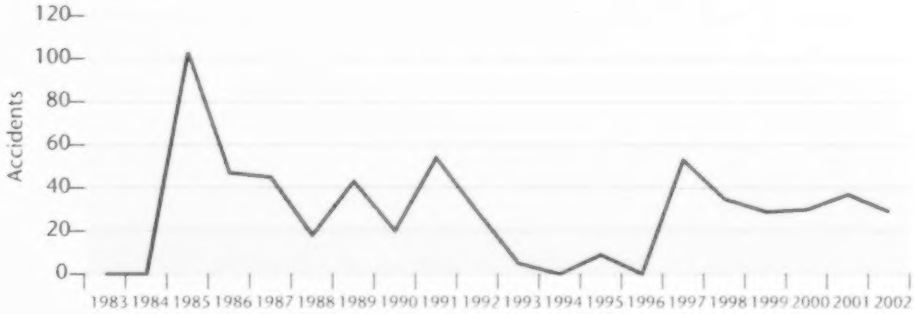
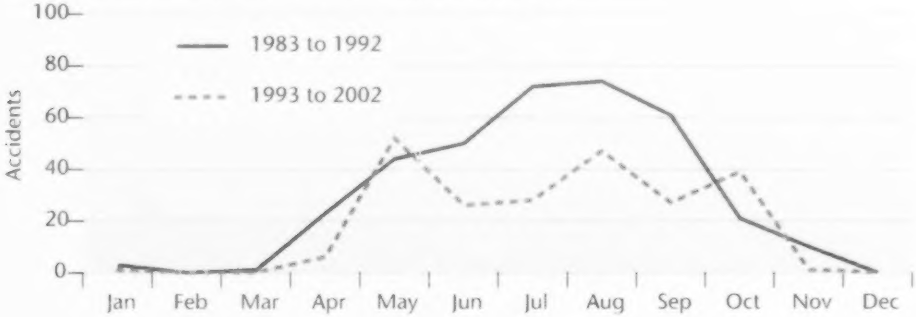


Figure 7.4.4.10 - District 11: Total Monthly Porcupine Accidents, (1983 to 2002)

10 Year Comparisons - 1983 to 1992 and 1993 to 2002



8.0 SUMMARY

The ongoing systematic daily collection of multi-species wildlife accident data by the Ministry's Maintenance Contractors continues to provide the Ministry with information critical for understanding the highway/wildlife habitat interface. In addition to helping identify motor vehicle-related accident trends among larger ungulates and carnivores, the WARS system has provided unexpected insights into the evolution of the Province's road ecology. It has been used to identify the introduction of alien species in the natural habitat (possums on Hornby Island; bison in the Peace Country) the colonization or recolonization of an area (coyotes in the Lower Mainland), and the impact of new highway development on higher carnivores (cougars on Vancouver Island).

The ability to continuously monitor wildlife accidents has become a vital component in understanding many of the spatial and temporal aspects of wildlife-related motor vehicle accidents in the Province. As the WARS database grows each year, it becomes an increasingly valuable tool for directing and focusing the Ministry wildlife accident mitigation efforts. As improvements in the WARS system occur over time, the Ministry's ability to proactively address the issues of wildlife-related motor vehicle accidents will increase. The success of the WARS system in British Columbia has made it a model for other agencies seeking to monitor wildlife-related motor vehicle accidents (Staines, B. *et al*, 2001; Ramp and Croft; 2002, L-P Tardiff and Associates, 2003.)

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APPENDIX 1

The Wildlife Rehabilitators Network of British Columbia

Member Rehabilitation Facilities

Region	Name, contact and specialty	Address and website	Phone and email
1 – Vancouver Island and Gulf Islands	Gabriola Rescue of Wildlife Society (GROWLS) – Darlene Mace-Harvey Rescue and transport all species	1430 Harrison Way Gabriola Island, BC V0R 1X2	(250) 247.7415 maceharvey@shaw.ca
	Island Wildlife Natural Care Centre – Jeff Lederman Marine mammals, homeopathy; treat all species	322 Langs Road Salt Spring Island, BC V8K 1N3 www.sealrescue.org	(250) 537.0777 iwncc@aol.com
	Mountainaire Avian Rescue Society (MARS) – Maj Birch Birds; rescue all species	6817 Headquarters Road Courtenay, BC V9J 1N2 www.wingtips.org	(250) 337.2021 mars@minfox.com
	North Island Wildlife Recovery Assn. – Robin and Sylvia Campbell Eagles, bears; treat all species	1240 Lefler Road P.O. Box 364 Errington, BC V0R 1V0 www.northislandwildliferecoverycenter.org	(250) 248.8534 niwra@nanaimo.ark.com
	Rory's Refuge – Aurora Paterson Birds	P.O. Box 45 Tofino BC, V0R 2Z0	(250) 725.3783 saw-whet@island.net
	Second Chance Wildlife Centre – Lorinne Anderson Raccoons, small mammals, nuisance wildlife advice; rescue all species	1788 Fielding Road Nanaimo, BC V9X 1T5 www.geocities.com/connladylori	(250) 618.8888 coonladylori@hotmail.com
	Thora Fleming Hummingbirds	866 Ash Street Campbell River, BC V9W 1G2	(250) 923.1524 t42@connected.bc.ca
	Wild Animal Rehabilitation Centre (SPCA WildARC) – Sara Dubois Small birds and mammals; rescue all species	1020 Malloch Road Victoria, BC V9C 4G9 SPCA – 3150 Napier Lane Victoria, BC V8T 4V5 www.wildarc.com	(250) 478.9453 SPCA – (250) 388.7722 wildarc@shaw.ca
2 – Lower Mainland and Sunshine Coast	Creature Comfort Wildlife Care – Cindy Rudolph Raccoons, small mammals, birds	5171 Brooks Road Halfmoon Bay, BC V0N 1Y2	(604) 885.4697 crudolph@uniserve.com
	Critter Care Wildlife Society – Gail Martin Mammals, education	481 – 216th Street Langley, BC V2Z 1R5 www.crittercarewildlife.org	(604) 530.2064 crittercare1@shaw.ca
	Elizabeth's Wildlife Centre – Elizabeth Melnick Small mammals and birds	32508 Verdon Way Abbotsford, BC V2T 7Y3 elizabeth_melnick@bc.sympatico.ca	(604) 855.3914 (pager) (604) 852.9173
	Gibsons Wildlife Rehabilitation Centre – Clint and Irene Davy Birds and small mammals	RR4 1211 Carmen Road Gibsons, BC V0N 1V4 www.gibsonswildlife.org	(604) 886.4989 gwrc@sunshine.net
	Monika's Wildlife Shelter – Monika Tolksdorf All species, research, education	8137 – 192nd Street Surrey, BC V4N 3G5 www.monikas.com	(604) 882.0908 wildlife@monikas.com

Region	**Name, contact and specialty**	**Address and website**	**Phone and email**
Lower Mainland and Sunshine Coast cont'd.	Orphaned Wildlife Rehabilitation Society (OWL) – Bev Day Raptors, education	3800 – 72nd Street Delta, BC V4K 3N2 www.owlcanada.ca	(604) 946.3171 owlrehab@dcnet.com
	Vancouver Aquarium Marine Mammal Rescue and Rehabilitation – Jeremy Fitz-Gibbons Marine mammals	845 Avison Way Stanley Park P.O. Box 3232 Vancouver, BC V6B 3X8	(604) 659.3545 (604) 659.3540
	Wildlife Rescue Association of BC (WRA) Birds, bats, oil spill; rescue all species	5216 Glencairn Drive Burnaby, BC V5B 3C1 www.wildliferescue.ca	604) 526.7275 wildlife@vcn.bc.ca
3 – Thompson	Kamloops Wildlife Park Wildlife Rehabilitation Centre – Paul Williams, John Benedik All species	9077 Dallas Drive P.O. Box 698 Kamloops, BC V2C 5L7 www.kamloopswildlife.org	(250) 573.3242 ext. 230 johnbenedik@kamloopswildlife.org
	Kee-Two Wildlife Rehabilitation Centre – Karen Beggs Raptors, migratory birds, small mammals	2061 – 70th Street SE Salmon Arm, BC V1E 1X4	(250) 832.8200
4 – Kootenay	BEAKS – Carol Pettigrew CWS Migratory permit only	318 – 103rd Street Castlegar, BC V1N 3G2	(250) 365.3701 cpet@netidea.com
5 – Cariboo	Raptor Rehabilitation Centre – Elizabeth Schupbach Raptors, waterfowl, migratory birds; rescue all species	Site 13C – 9 RR4 Williams Lake, BC V2G 2P1	(250) 989.8900
	Sedge and Dona-Gail Barnes Stabilization and transport	3985 McLean Road Quesnel, BC V2J 6V5	(250) 992.7787
6 – Skeena	Janet Gifford-Brown Birds, small mammals	P.O. Box 57, Tlell Queen Charlotte Islands, BC V0T 1Y0	(250) 557.4253 jgbrown@qcislands.net
	Prince Rupert Wildlife Rehabilitation Shelter – Nancy and Gunther Golinia Raptors, all species	P.O. Box 26 Prince Rupert, BC V8J 3P4 www.citytel.net/wildlife	(250) 624.4143 fax (250) 624.4159 wildlife@citytel.net
	Peter Grundmann & Nancy Robbins Raptors, all spp.	PO Box 438 Sandspit, Queen Charlotte Islands, BC V0T 1Y0	(250) 637.5499
7A – Omineca	Northern Wildlife Rescue Society – Rachel Morey Raptors and small mammals	2269 Canan Way Prince George, BC V2K 4A7 www.northernwildliferescue.com	(250) 962.0015 info@northernwildliferescue.com
7B – Peace	Northern Lights Wildlife Society – Angelika Langen Bears, large ungulates, raptors	17366 Telkwa High Road Smithers, BC V0J 2N7	(250) 847.5101
8 – Okanagan	South Okanagan Rehabilitation Centre for Owls – Sherri Klein Raptors	P.O. Box 1166 RR2 Eagle Bluff Road Oliver, BC V0H 1T0 www.sorco.org	(250) 498.4251 sherriklein@telus.net
Out of BC	Progressive Animal Welfare Society (PAWS) – Kip Parker Large mammals, treat all spp.	15305 – 44th Avenue W Lynnwood, WA USA 98037 www.paws.org	(425) 787.2500 kparker@paws.org